AMERICAN AGRICULTURIST

FOR THE

FARM · GARDEN · & · HOUSEHOLD

"AGRICULTURE IS THE MOST HEALTHFUL, MOST USEFUL, AND MOST NOBLE EMPLOYMENT OF MAN."—WASHINGTON.

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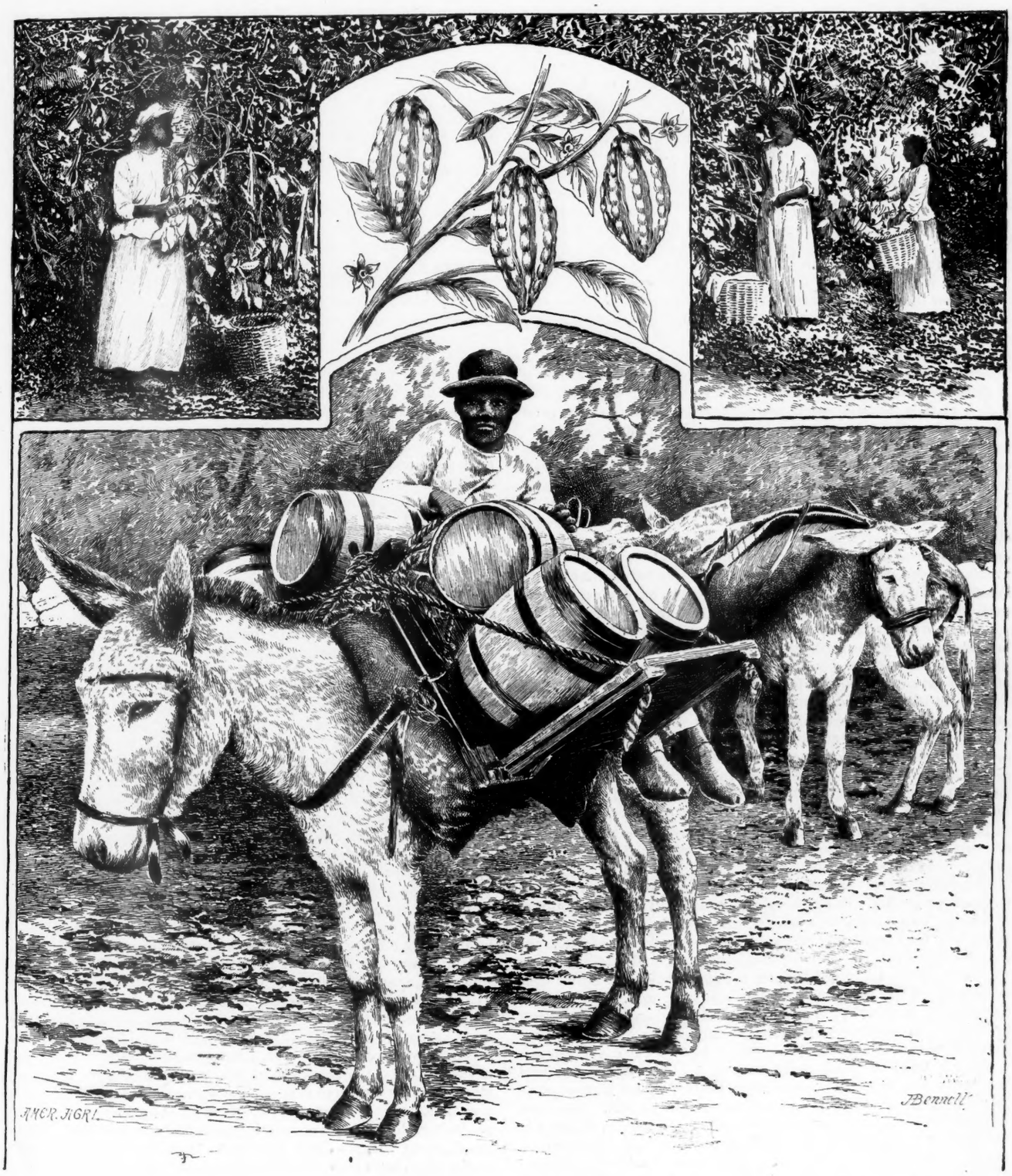

VENEZUELAN FARMING SCENES. (*See Page* 300.)

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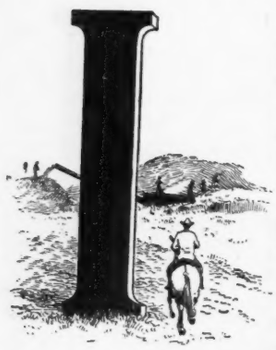
THE NORTHWESTERN WHEAT CROP.

RICHARD WAUGH, MANITOBA.



IT will not be disputed by any one whose opinion is worth counting on, that the spring wheat of the new Northwest is one of the choicest of the cereal products of the world. Of course, the possibility of its production has been greatly exaggerated by the boomers, whose business it is to talk value into the prairies of the Northwest. But those who, during the closing months of last year, rode five hundred miles south or west from Winnipeg, will be quite ready to admit that it is hardly possible to reckon up the quantity of wheat which careful cultivation may, in a favorable season, produce, whenever the world's necessities call for such an effort. It is on the North Dakota side of the Red River valley, where cultivation has opened most freely, and there was great trouble to find machines and men to thresh out the great wheat crop of 1891. But the weather has been more favorable to the production of the highest grade of wheat in the western uplands, than even in the valley itself, where, through waiting too long for the chance of threshing on the field, the grade was considerably lowered by rain and wind storms.

A most interesting experiment was last year tried in Minnesota, showing that even in nearly the same climate, and with the very same seed, a difference in the quality of the soil, and other minor conditions, may produce from No. 1 Hard Red Fyfe wheat sown, a return of grades running from No. 1 Hard down to very close on Rejected. A tolerably dry prairie, with an original vegetation of mixed grasses, annual weeds and flowers, will, in a fairly good year, produce No. 1 Hard. But if the land is flat and spongy, covered mainly with swamp grasses, or has been partly covered with scrub, then the product from the best of seed will rarely grade high. Of nearly eighty samples of Red Fyfe wheat, grown on many varieties of soil, from seed supplied by Mr. Pillsbury, the great Minneapolis miller, I question if one third will make a high grade. Had the same seed been sown on dry upland prairie, more than half of the resulting crop would have made good Hard, and in less prolific seasons it would have done considerably better than it did last year. The best Red Fyfe shows in the field hard, clear straws, rarely more than three feet long, and heads three inches.

There is not such wild enthusiasm now in the wheat-growing business, as there was eight or ten years ago. Then, wealthy speculators and syndicates bought land by the square mile, and acres of machinery of the most approved pattern, that they might coin money out of the virgin prairie. But summer frosts, hail, drouths and hot winds have somewhat chilled their glowing anticipations, and the profits have averaged nothing very great, whatever might be the success of first rate managers and a lucky minority. I have seen land that paid for itself every year, for three years in succession, after all charges for seed and labor were provided for. I have also seen good men with only one good crop to three comparative failures. I calculate on fairly profitable seasons for a year or two to come, and if these hopes are fulfilled, wheat-growing will be one of the most profitable kinds of farming on this continent.

Summer frosts are mainly attributable to rapid radiation through a very dry, clear atmosphere, which will cause a drop for, it may be, two nights in a season, till there is from one to five degrees of frost, generally just at or before daylight. If there are hollows or valleys, the cold air, thus generated, will settle in them, the moist, warm air rising to form a higher layer of warmer temperature, and the grain in the valley will be frozen, while that on the uplands may be quite unharmed. Smudging, which consists of burning damp straw or manure, so as to cover the crop with a layer of smoke, is generally believed to be a considerable protection, as it tends to check radiation, and has been much practiced the past year. Hot winds, originating about Western Kansas, have scorched grain on the stalk, and hail mows wide swaths. However, if it strikes before the middle of July, the grain will do wonders in the way of recuperation, and fields, apparently half rooted up by the hail, will make a good half crop of nice wheat before the end of September. I have a prize-winning sample from a field almost hailed out on July 5th, but reaped on September 30th from the second growth. But, as a rule, hail is a terrible scourge, and a bad storm will sweep a path twenty to fifty miles long, and several miles wide, ruining almost every crop where it strikes. Hail insurance, where practiced, spreads the loss. No antidote is possible.

Drouth had prevailed, with more or less severity, from 1886 to 1889, but in 1889 there were showers enough to make a very fine crop on all well cultivated lands, while on light and badly farmed lands there were often no crops worth gathering. If the soil is first well worked, and then well firmed down, much of it will give a fair yield, with next to no rain, and I have seen a thirty-bushel crop that never had a drop. Many homesteaders that were induced, by the fine crop of 1887, to go on land which they had little skill to manage, had a terribly hard experience in the two dry seasons that followed.

A great deal is said about the merits of Ladoga wheat as an early ripener, and likely to escape frost much oftener than Red Fyfe. It is earlier, and in the high Northwest has made good results. But it is less prolific, by several bushels an acre, and I strongly doubt its value for flour. Any one trying it on land suitable for Red Fyfe, will find that south of 49° it will most likely be of a poor grade. With all its demerits, I know nothing to excel Red Fyfe, as a main crop, while south of 46° Blue-stem may usually take the lead.

That wheat can be grown, of fair quality, and in moderate quantity, all the way to the Rocky Mountains, I am well assured, and have here samples of Red Fyfe and Ladoga, grown in 56° north latitude, at Shaftesbury, on the Peace river, that are as good as the average of the same sorts sold as No. 1 Hard here. The Fyfe made thirty-five bushels to the acre, and one missionary alleges that he raised white wheat eight years in succession without having it frozen. But so far West the climate is much modified by the chinook winds blowing through the passes of the Rockies. Nearer the center of the continent, 52° north latitude, may be taken as the limit of production, and, even there, only when good soil, abundant sunshine, and moderate rainfall present the conditions favorable to wheat growth. Fall sown wheat, though often tried, seldom does any good. If put in a good seed bed, Red Fyfe will ripen in from one hundred and twenty to one hundred and thirty-five days, though small lots, sown toward the end of May, will, in a favorable summer, make much quicker growth, but always at a shortage of the yield.

HOW TO BUILD THE SILO AND GROW THE CROP FOR IT.

JOHN GOULD, OHIO.

The general verdict now is that the silo built of wood, and made durable, with seams and pores closed by some kind of waterproof paint, is not only more economical than the stone structure, but actually is a better agent in the preservation of the silage. Stone, being not only porous but a good conductor of heat, is not to be relied upon under all circumstances for this purpose. Air penetrates the walls, frost goes through the stone and precipitates moisture on the inside surface of the silo, and this moistened silage freezes into blocks of ice. On the other hand, the wooden silo is impenetrable to ordinary degrees of frost, wood being a poor conductor of heat. Waterproof paint makes the walls not only free from moisture, but excludes the air perfectly; wood is cheaply transported and obtainable everywhere, and the silo can be built at a reasonable cost. It may be located in the corner of a barn, a shed, built on as a lean-to, or, if furnished with a roof, may be set up as a separate building.

Just how thick the silo walls should be built is yet undecided. The fact is, both parties are awaiting the evidence as between the merits of the double-boarded silo, made of cheap, unmatched, sound lumber with a lining of tarred paper between, or the single ceiled silo lined up with four-inch flooring, put on with the horizontal grooves upward, and filled with paint as the building proceeds. The cost is not greatly different in either case, as it is a case of a larger amount of cheap lumber against a single thickness of the more expensive matched flooring. The lathed and plastered silo promised well at the start, as a compromise between wood and stone, but the corrosive action of acid causes the plaster to lose its strength in two or three years, if not sooner. The choice is, therefore, practically between the two forms of the wholly wooden silo, made durable by a coat of paint composed of gas tar thinned by an equal amount of gasoline. The round tank silo has many friends in the West, and, built of good material, has much to recommend it as it needs no bracing or extra strength. The foundation of the wooden silo has also undergone modification. It is claimed that a sill twelve inches square, of timber, well coated with gas tar, set

in a trench and firmed in with a backing of hydraulic cement, is superior as a foundation, in most localities, to stone. Then the floor of the silo made of clay well pounded down, somewhat lower in the center, coming up a few inches on the sides of the walls, is quite as good as the stone and gravel floor, and keeps the silage just as well.

As to the crop, corn is the best adapted to the use of the silo of any plant yet used. What varieties to plant, and how, are largely to be determined by locality. Where the season will admit of a full growth, some of the large varieties are best, notably the white horse-tooth corn of Virginia. This variety makes heavy growth, and, when planted thinly and not root pruned, gives a great yield of ears and fodder, and for keeping qualities in the silo has no superior. To grow for silage profitably, the biggest crop that will ear and mature is best, as it is not found in practice that a big stalk is superabundant in moisture, or below smaller kinds in nutritive qualities, provided it is not planted too thickly and the roots are left undisturbed, by employing only shallow culture. This corn is also noted for its saccharine quality, a great help in attaining the result of sweet silage. In latitudes where the corn growing period is very brief, the smaller varieties are best. Pride of the North is held in great favor in most Northern latitudes.

Ensilage corn is best when planted and cared for as it would be if designed for a field crop. It is best drilled in rows, three and one-half feet apart, one kernel every eight inches. If the ground is made very fine and free from rubbish, the greater part of the cultivation can be done with slanting-toothed harrows, and these followed by a good weeder, finishing up the job with one or two light workings with a Planet Jr. cultivator. Corn for silage should be cultivated frequently, but not more than an inch in depth. Corn roots run in rich soil quite close to the surface, and continual cutting them off when cultivating checks the growth of the corn, delays the earing and so prevents storing up its full quota of nutrition. It is now, in some quarters, recommended to sow six quarts of clover after the last working of the corn, and thus seed the field to clover and gain almost a full year in rotation. The Pennsylvania Station, in a single experiment, seemed to show that silage corn, even of the large varieties, might be planted somewhat thicker, and result in a total larger per cent. of food material upon an acre. Prof. Ormsby says: "On comparison I find that by the use of twenty quarts of seed per acre it gave forty-one per cent. more dry matter than did six and one-half quarts of the same variety on another acre. The large variety gave me forty-three per cent. more dry matter than the smaller variety of corn, and the large corn was three and one-half per cent. more digestible than the small kinds, and that on well cared for large varieties so planted as to develop full ears, the idea that the gain in weight is 'simply wood and water,' is largely a matter of opinion, and the results favor the growing of large varieties, and somewhat thicker seeding."

EXTENT OF AMERICAN MARKET GARDENING.

J. H. HALE, CONNECTICUT.

There is a wide range between various grades of market gardens. A friend of mine on a single acre of land in the city, keeps one horse, hires one man, has a small greenhouse and almost four hundred feet of hotbed, and buys all the manure from a stable of seven horses. He begins the year with lettuce from the greenhouse in January, radishes follow, and then beets for transplanting. Lettuce and radishes come from the hotbeds in February and March, followed by summer squash and cucumbers. Spinach, dandelions, peas and transplanted beets are the first products from the open ground, and are followed in rapid succession by a great variety of seasonable vegetables, till celery and winter cabbage make the late fall crops to be gathered in November. The products of this place are nearly all sold at full retail price, direct to families, and the net income from the acre is from eight hundred to one thousand dollars annually.

Another market-garden establishment is six hundred acres in extent, has nearly six acres under glass, employs regularly from one hundred and fifty to one hundred and seventy-five men, and often two hundred in the busiest season of crop gathering. Seventy-five horses and mules and a number of yokes of oxen are kept at work, and, besides all the manure made on the place, there is purchased from the city stables the product from two thousand and two hundred horses. Thirty thousand to forty thousand dollars worth of lettuce is annually sold from the greenhouses. One hundred and fifty acres of cucumbers, fifty of sweet corn, forty each of peas and tomatoes and many acres in smaller crops are grown, that swell the income from the place to upwards of two hundred thousand dollars per annum. This whole business has resulted from the gradual development of a small market garden, started less than twenty-five years ago, and serves well to show the wonderful growth of the market-gardening interest during the last quarter of a century. Similar cases of successful market gardening can be found in almost every State of the Union, and new localities, particularly adapted to special crops, are constantly developing.

Not all market gardeners are successful, yet, on the whole, the profits of the industry are far greater than in most branches of farming, and are likely to continue to be so in the future. The census investigation of truck farms shows that there are over one-half a million acres devoted to the business, with an invested capital of about one hundred million dollars, employing two hundred and sixteen thousand, seven hundred and sixty-five men, nine thousand, two hundred and fifty-four women, fourteen thousand, eight hundred and seventy-four children and seventy-five thousand, eight hundred and sixty-six horses and mules, with value of products in the census year (June 1st, 1889, to June 1st, 1890), valued at seventy-six million, five hundred and seventeen thousand, one hundred and fifty-five dollars. Doubtless the market garden acreage is not more than one-half as much, but as the yield per acre upon the small places is very much greater, and prices obtained for product much higher than those from the truck farms, the annual income from the market garden farms of the country cannot be estimated at less than one hundred millions of dollars.

BIRDS vs. INSECTS.

DR. B. D. HALSTED.

In Nature there is a general overruling law which is roughly stated in the common saying, "The weakest must go to the wall," the action of which is very self-evident to those who have given much attention to the study of birds and insects. It is only when man so modifies Nature that the law does not have free action that the balance is destroyed, and evil results. Insects, as well as the birds, doubtless have their proper place to fill in the great scheme of creation, and, like many things else, when held within bounds are for the common good. "When the cat is away the mice will play." So when the birds are scarce the insects abound, sometimes to our discomfort, and even dismay. I do not wish here to make any plea for the protection of birds on the grounds of beauty of their form or coloring, or the sweetness of their songs, but upon the purely utilitarian basis of guardians of crops from the destructive workings of the various injurious insects. Some birds do not eat insects, but the list is small. Audubon has stated that a woodcock will eat its own weight of insects in a day. The common chipping sparrow destroys many a tent caterpillar moth. Birds have been constantly on the decrease, from the destruction of the forests and other more direct causes due to man, while, on the other hand, the insects have steadily increased. There seems to be an eternal hatred of birds born with some boys, which it is painful to see in its varied manifestations. The stoning of old birds, robbing their nests, and killing the young, is to be strongly condemned. Kindness to our feathered friends must come largely from home and school training. Parent and teacher can do much in this regard.

Dewberries. — The cultivated sorts of dewberries represent species of *Rubus*, namely, *R. Canadenses* and *R. trivalis*. They differ from the blackberries in having the flower cluster open, with the oldest blossom at the center, while the blackberries have a comparatively dense cluster, and the first flowers are lowermost. The blackberries have suckers, while the dewberries propagate at the tips. The dewberries have some good points, the chief ones being earliness, large size, ease of winter protection, and attractiveness. The disadvantages are failure of flowers to set and the difficulty of picking. Both these objections could be overcome to a large degree by training and pruning. A wire trellis may be used similar to that employed for grapevines, and a mulch of straw keeps the berries clean. Professor Bailey mentions in his bulletin that there are twelve varieties named, and more or less disseminated during the past twenty years. While this fruit has not, as yet, found favor among the masses, it is true that many persons have found it profitable. Four varieties are growing in prominence, namely, Windom, Lucretia, Bortel and Manitu. The Lucretia is badly attacked by anthracnose and rust; the Bortel has not done well in the East, Manitu is good in the South. The Windom enjoys partial shade, and ofttimes this fact may be in its favor

FARMING IN VENEZUELA.

I. N. FORD.

Venezuela may be roughly described as a triangle with nearly equal sides, one of which is a coast line of 1,500 miles, another an irregular frontier running south from Cape Vela into the heart of the continent, and the third an Andean chain parallel with the maritime range. Within these lines is embraced an area where room could be found for three Germanys. The mountainous coast belt is the only one which can be said to be either cultivated or inhabited. Out of a total population of 2,250,000 considerably more than 2,000,000 is centered in the seven States bordering upon the sea. The cultivated belt has behind it a broad stretch of grazing country in the valley of the Orinoco; and back of this there is a forest region of great mineral wealth. Venezuela was the first country on the mainland discovered by Columbus, but it is among the last in the order of industrial development. It is known to be rich in gold, copper, iron, coal, and timber; it has resources for rivaling the Argentine and Southern Brazil as a grazing country; and it has tracts for coffee, cacao and sugar unequaled in fertility. Under progressive conditions of foreign trade, it has been doubling the volume of its foreign trade during the last twenty years. With railway construction and immigration, on a large scale, it could be converted into the most prosperous agricultural State in South America. The high table-lands and mountain slopes are preëminently adapted for coffee farming, and the lower levels for the cultivation of cacao and sugar. No sugar is exported, the processes of manufacture being primitive, and barely enough being produced for home consumption, and for the distillation of cheap rum for the natives. Indigo, which was one of the earliest Spanish industries, has practically been abandoned. Cacao, which was also introduced by the pioneer colonists survives in a flourishing state, but coffee is the chief agricultural staple. The productive zone for coffee begins at an elevation of 1,500 feet above the sea. The mountain slopes behind Lake Maracaybo and the undulating valleys of Carácas and Valencia are the best districts. The shrubs are set out when nine months old and eighteen inches high, and are planted about eight feet apart. For four years they are delicate and need to be shaded from the heat of the sun. Bearing moderately in the fourth year, they are at maturity in the sixth, and yield half a pound to the shrub until the twenty-fifth year.

BAMBOO GROVE AT CARACAS.

Venezuela is already producing 90,000,000 pounds a year and is, after Brazil, the largest storehouse for the American market. The coffee sent to the United States is mainly produced in the Maracaybo district, and is inferior to the grades ordinarily shipped to Europe from La Guayra. The quality depends less upon the locality than upon the elevation. That which is cultivated on hot lands is the poorest; then there is an intermediate grade from what is known as the temperate coffee zone; and the finest berries in size and color are produced on the highest and coolest mountain slopes. If the Venezuelan coffee belt were under systematic cultivation it would be large enough to supply the American market. Labor and railways are now lacking, and until these are supplied the coffee production of Venezuela can never be adequately developed.

Linnæus was so fond of chocolate that he gave to the tree which ministered to his pleasure the name of *Theobroma cacao*, the food of the gods. It is a tree remarkable for vital energy, bearing fruit in Ecuador and the forests of the Amazon three times a year, and on the coast of Venezuela twice. It resembles in appearance a lilac, seldom exceeding twenty feet in height, and having sharp-pointed, oblong leaves. The flowers grow directly from the branches and trunk, and from these is developed a yellowish-red fruit-pod, shaped like a cucumber and from eight to ten inches in length. Underneath a tough rind is a mass of white pulp containing seeds shaped like almonds. There are several varieties of cacao, the fruit differing in size, the number of seeds embedded in the pulp and the proportion of oil. In Venezuela the fruit contains from ten to twenty-five seeds; in Brazil and Ecuador it is larger and has as many as forty seeds. Nuts which are rich in oil are not exported, since they are liable to rot. When the fruit-pods are picked in December or June, the seed, or nuts, are taken from the pulp and allowed to dry in the sun either with or without fermentation.

The best flavored cacao is that which has been subjected to a slight degree of fermentation, either in an earth pit or in a sweating-tub. Raw cacao is manufactured into various compounds. The seeds are roasted in revolving cylinders, crushed by machinery, and winnowed by a fan-blast. When the broken husks have been removed, the residue known as the nibs is boiled and then ground to a fine powder. This is cocoa; but what is ordinarily sold under that name is adulterated with other substances to counteract the cocoa fat and to render it more soluble. Broma is a dry paste with

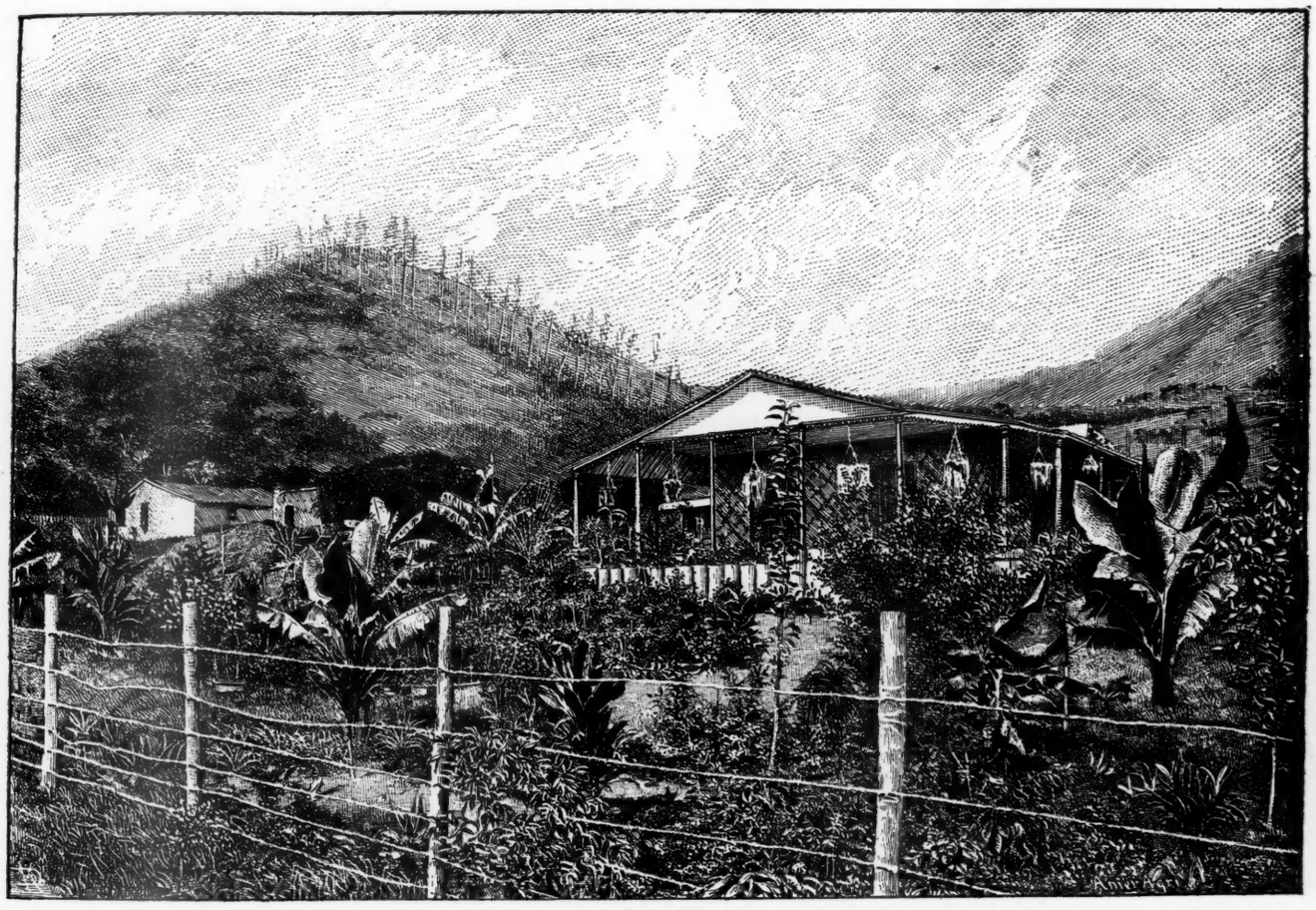
the oil of the bean left out. Chocolate is a compound of cacao nibs and sugar flavored with vanilla.

Cacao was one of the earliest products carried by the Spanish conquerors from the New to the Old World. The companions of Cortez found the Aztec beverage, chocolate, in Mexico, and Pizarro's warriors learned to drink it in the lands of the Incas. It was taken to the Spanish court as one of the curiosities of the New World, and it became at once the luxurious beverage of the rich, and in course of time the common drink of the poor. The first supplies of cacao were drawn from Mexico; then its cultivation was undertaken in the West Indies, and from Curaçoa it was carried into Venezuela during the eighteenth century; and Brazil, Ecuador and Guiana are now producing it successfully, the industry having declined in Mexico, Peru and Central America. While the forests of the Amazon are filled with wild cacao trees, the main sources of supply are the cultivated orchards of the Venezuelan coast, Trinidad, the Windward Islands and Ecuador.

The process of cultivation in the vicinity of Carácas is exceedingly simple. The seedlings are kept in nurseries until they are from fifteen to eighteen inches in height. They are then set out in rich, well-watered soil, about 250 to the acre, and during the first four years are heavily shaded either with bananas or coral trees. Beyond the labor of keeping down weeds nothing is done to assist the shrubs. It requires humid air and cannot bear fruit at altitudes above 1,500 feet. It is sensitive and cannot stand exposure to cold mountain winds. In the fifth year it begins to yield fruit, but is not in its prime before the eighth year. Then a well-nourished tree is capable of producing 8,000 nuts a year, and this average is often exceeded. The effect of cultivation is to diminish the size and to shorten the natural life of the tree. A wild cacao in the forest will bear fruit for seventy years. The limit of profitable cultivation is reached in fifty years.

Of all the tropical industries this is the one which offers the fewest difficulties and requires the least labor. The cacao tree is not attacked by pests, suffers neither from drouth nor excessive rain, and thrives in ordinary soil with little cultivation. It requires protection like the coffee tree in Venezuela, the leaves falling off and the fruit shriveling when it is exposed to fierce sunlight. When a seedling is old enough to bear fruit it is prepared to take care of itself for half a century. Experienced planters represent the cost of a cacao farm of 25,000 trees, including the clearing of 100 acres, the setting out of seedlings and bananas, and four years' labor in spudding weeds, as about $20,000, and the annual profits after that period as $25,000 or $30,000.

These results have an attractive look on paper, but there are few prosperous cacao planters to be found in either the West Indies, Brazil or Venezuela. Overproduction has cheapened the price until all estimates of profit have become illusory. What is wanted is a larger market for cocoa and chocolate. Spain, France and Germany now take the bulk of the product of this energetic tropical tree, and the United States a comparatively small amount. If Americans were to acquire the German and French taste for chocolate in place of coffee, Venezuela would profit largely by it, for the seaboard, from Cumana to the Eastern headlands of the Gulf of Venezuela is adapted for the cultivation of cacao. Americans crave, and possibly require, a stimulative rather than strictly nutritious beverage, and consequently the easier and more profitable industry is restricted, and coffee is the chief staple of Venezuela. The labor on a cacao plantation is mainly confined to the gathering and curing of the crop. The ripe pods are cut off with knife-pointed poles; the seeds are not damaged if the fruit remains on the ground for several days, and the process of removing the pulp and straining the seeds is a simple one. Good judgment is required for timing the period of fermentation, but at every other stage of this agricultural industry skilled labor can be dispensed with.



A VENEZUELA PLANTER'S COUNTRY HOME.

Adequate supplies of labor are lacking both for coffee and cacao planting. European emigrants have gone to Brazil, the Platte countries and Chili in preference to Venezuela. The agricultural industries are wholly dependent upon the mixed races of Indian and negro blood inhabiting the coast range. As a working class it is without thrift and ambition, content to live in bamboo or palm-covered huts under extreme conditions of squalor and hardship, and both indolent and intemperate in habits. There can be no important development of Venezuelan resources until this

inferior working stock is recruited from Europe. The few short railways now in operation have not been built with reference to the transportation of coffee, which is taken to the coast mainly on the backs of mules. The only roads known outside of cities like Carácas, Valencia and Maracaybo are mule trails. By these, merchandise is carried to the villages among the mountains and coffee and cacao are taken to the nearest port.

The finest fruit region in Venezuela lies back of Puerto Cabello. Oranges of excellent flavor are raised at a height of 2,000 feet above sea level, and at a distance of forty miles inland. It is a wild stock which has not been improved by any of the processes familiar to Florida fruit-raisers. Limes and bananas are abundant. Bananas are required on the coffee farms for shade, and, if the fruit could be transported economically to the coast, the country might compete successfully with Jamaica and Central America in supplying the American markets. With mule trails as a substitute for railways and river steamers this is impracticable.

The Orinoco valley is a pastoral belt of undeveloped resources. The native stock born in the salubrious mountain valleys near the coast dislikes the low bottom lands of the river, and the government has lacked the energy requisite for opening that vast region to European settlement. There is a cattle herd of, perhaps, 10,000,000, and there are half as many sheep and goats. The Orinoco valley lacks nothing but population, and there is apparently no immediate prospect that this want will be supplied and the exports of hides and wool largely increased. The forest zone rivals the upper valley of the Amazon in range of production. About 2,000 samples of wood have been displayed at national exhibitions, including the finest tropical cabinet timber.

Bamboos grow with great luxuriance wherever there is provision made for keeping the soil moist. Splendid specimens of these are seen in the Guzman Blanco public garden in Carácas. There are many kinds of palms, from which vinegar, oil, soap, bagging, mats, hammocks and baskets, are made by the natives. Of dyewoods and tanning material there is an inexhaustible supply, and medicinal plants like the cocoa shrub can be cultivated with success. There is neither capital nor labor in the country for turning its manifold resources to practical account. European investments and immigration have been repelled by political disorders and corrupt administration. Agricultural industry has been practically restricted to cacao and coffee.

[In the corner of the upper part of our frontispiece are seen coffee pickers at work. A branch of cacao bearing fruit and flowers is represented in the center, and in the lower part of the engraving is portrayed a donkey train carrying freight to the seaport. On Page 4 are shown clumps of magnificent specimens of bamboos growing in the Guzman Blanco Public Gardens of Carácas. On Page 5 is given a view of the country home of a wealthy Venezuelan planter.]

CARE OF THE HEIFER CALF.

G. JOHNS.

The idea in past years, by the many, has been that a cow was a cow and, if one was better than another, it was a case of "cow luck." This left fine breeding in the hands of the few. It was called the rich farmer's "sport," which the ordinary farmer could not afford, and bear the extra expense of keeping fine cows. A change is now apparent. Only the rich can afford to keep a poor cow. Good breeding and rational care have much to do with the development of the cow. Let the breed or grade be what it may, the calf, if worth raising at all, deserves good care and treatment. The idea is here expressed that many a worthless cow to-day, if she had been properly treated when a calf and heifer, cared for and suitably fed, would have made a far better cow, of fine productive powers. For, while all cows have a born possibility, the owner is responsible if this cow is not developed into that extreme limit of production.

To this end the heifer calf should have a line of good ancestry. A noted authority says that "cows breed from the blood, not their performance," so that a heifer calf from a milking strain is preferable to one that has a promiscuous parentage. The care of a calf and cow is a matter of administering to the office of the cow's motherhood, and all of the directing agencies of stable and field should be to enlarge the powers of the animal to increase her milk production, so that when the heifer, at twenty-eight or thirty months old, comes into the dairy, she will be to all intents and purposes a developed cow.

The calf, if a spring arrival, should be taken from the cow in due time, and put on prepared food. Here the dairyman must face the question whether to take the calf off at once, or allow it to run with the mother for a few weeks. A matter of profits comes in, for butter fats are worth twenty-five cents per pound, and the latter practice soon makes the little heifer a costly one. Skim milk, even when lavishly fed, is not an ideal food. In the stomach of the young calves it does not readily digest, for, while the butter fats are not in themselves a sustaining food, they are great promoters of digestion and creators of energy. If profit is an object, and growth is insisted upon, a substitute must be found. Linseed meal, cooked to a jelly and added to skim milk, at the rate of about two pounds to one hundred pounds of milk, makes the ration about equal to whole milk. Later on, oatmeal, with the hulls sifted out and then scalded, makes a capital addition to the linseed. Feed the milk sweet and warm. Do not let it get sour, and then feed cold. Sour milk has lost about all of its sugar element. The sugar, next to the casein, is the most important thing in skim milk. Think of feeding a baby calf cold sour milk! What mother would think of feeding it to her own baby, and yet this is, over and over again, a man's judgment of infantile wants.

When the calf has developed its fourth stomach and begins to chew its cud, solids may be fed along with the fluids, but the milk or mush must not be abandoned for some months. I am inclined to think that the calf should be stabled the first summer; not tied up, but given the freedom of a stable, well bedded, and not be compelled to undergo the life of a "grasser." It costs as much to keep the brood of flies that subsist upon the summer calf as the calf itself, with the additional disadvantage that the calf is compelled to prepare this food for the flies. If the stable will enable the calf to retain the flies' share, the gain in growth will be surprising. There is no reason why the heifer calf should be so poorly kept that, when six months old, it will sell for less than a veal calf of four weeks. When the time of stomach development ceases, clover, whole oats, and similar food, may be fed, but the feeding should not be so lavish as to induce a beef-forming habit. Feed so as to make good growth and thrift. If we so feed as to fatten the heifer unduly, the tendency is that, when high feeding for milk is attempted, the beef form again appears, and is hard to hold in check. Handle the little calf so that when it develops into a heifer it will have cow habits. Make her life as cow-like as possible. Do not fool with her, but handle her; go through with the milking motions, at least, so that when she takes her place in the dairy she will not have to be subjected to the "breaking" ordeal.

The two-year-old heifers had best run with the dairy herd, come and go with it, take their places in the stables and have their dish of bran. These heifers are now expected to calve in October, and through the summer each one has not only her own life and growth to provide for, but another life must be supported, bone and muscle provided for. Nitrogenous foods, like oats and clover, have had a stimulating effect upon milk production, and at this time it is fair to suppose also a developing effect upon the udder itself.

This, with good stable life in the winter, flesh-making foods rather than fattening ones, and those to some extent of a somewhat succulent character, regular feeding and comfortable warmth, absence of the "toughening" process, with plenty of pure air and abundant sunlight to build up constitution and vigor, will give us the hardy cow with power to transmit her good qualities to her daughters.

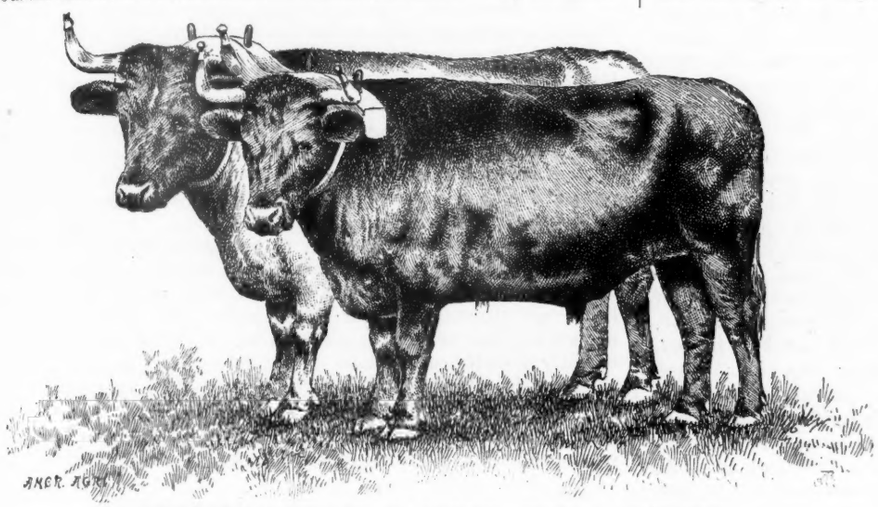
PROPER PRESSURE IN CHEESE MAKING.

J. G. FARMER.

A frequent mistake is to apply too strong pressure at first to the newly-hooped curd. The pressure should be gradual, and the snug squeeze only given after several hours. The white whey that starts from a severely pressed curd, is rich in butter fats, which will not appear if the curd is allowed to settle firmly in the hoop before strong pressure is applied. The facts go to show that the average full cream cheese has parted with far too much of its fats in press, vats, drainers and hoops, and is often found to be a half-skim when it reaches the consumer. Great hue-and-cry is raised over the idea that it is commercial wisdom to take out a pound of butter fat to each hundred pounds of milk, which tests four and one-half per cent. fat for cheese making. The cheese is no better that has lost that amount of fat in manufacture, than is another cheese from which has been skimmed an equal amount, and the balance of the fat retained by skillful manufacture. A little care at the beginning of the operations will always prevent such wastes and result in a better product.

A HEAVY PAIR OF STEERS.

Our illustration represents two steers, which for size, uniformity of color, and exact matching are probably without rivals in this or any other country. The combined weight of the two is 5,500 pounds, or two and three-quarters tons, and only two pounds difference when last weighed. They are four years old, perfectly black, and so nearly alike that it is extremely difficult, even for their owners, to tell one from the other. They are cross-bred, three-fourths Holstein-Friesian and one-fourth Shorthorn. They are accustomed to the yoke, as will be seen by the illustration, which was engraved from a photograph. The owner states, however, that they are not worked regularly, but occasionally do light work. One would suppose that almost any ordinary work would be light for such a stately pair of Jumbos. They were bred by Frederick Richmond, of New Milford, Conn., and are owned by C. W. Barnum, of Lime Rock, Conn.



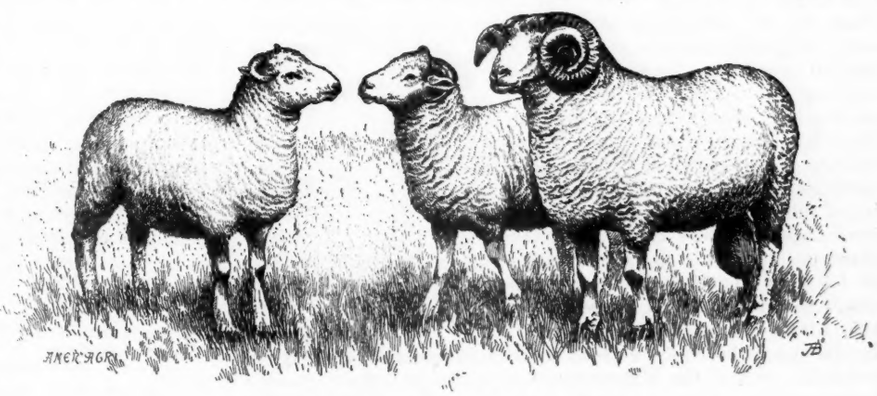
MR. BARNUM'S FAMOUS TWIN STEERS.

DORSET HORNED SHEEP.

J. S. WOODWARD, N. Y.

Great Britain, including England, Wales and Scotland, has more distinct breeds of domestic animals than any other country of twice its area. This applies with special force to sheep. All English sheep may be classed under the one great head, "Mutton Sheep," and this may be subdivided into "Long Wools" and "Medium Wools." But the close observer will find each of these broken into numerous families or breeds. Several of these are in a manner intermediate, and have resulted from the crossing of the more distinct breeds. The variations so marked and distinct, in many cases, are to be attributed largely to differences in food, natural and supplied, and in the way they have been bred, selected and treated. Much of the superiority of English sheep as mutton makers is due to the fact that they are liberally fed on such foods as produce a large growth of meat, of the best quality. However good the pastures, English sheep get, every day in addition, a little "corn" (broken oil cake, with often a mixture of barley or wheat bran). In winter they always have roots or other green feed with their general rations. Among English breeds none are more distinctly marked in their characteristics than the Dorset Horned. In the South of England, in Dorsetshire and adjacent parts of Somersetshire, they have been bred for so long a time that neither history nor tradition can give any authentic account of the origin. In all England, beside, there is no other breed like them, nor do they appear to have been crossed with any other breeds. There is a sheep, the Exmoors in the adjoining county of Devon, somewhat resembling them in shape, and like them, all have horns, but they are not as large. The skin about the eyes and of the nose and mouth of the Dorset is a bright pink, but in the Exmoor it is black, and, unlike the Dorset, they breed but once a year, and never in the fall or winter. Dorset Horns belong to the middle-wool class, producing a very soft, silky wool which sells for the highest price. They are of medium size, the ewes weighing, when in good condition, from eighty-five to 125 pounds, of good mutton shape, though in this respect, not quite equal to the Southdown. They are hardy, healthy, very prolific, the ewes, after one year old, and after first lamb, bringing largely twins, and not unfrequently triplets. The writer had a ewe which dropped eleven lambs inside of two years, one pair of twins and three sets of triplets. Of course, she was carrying the twins before the beginning of the two years. They naturally have lambs in the fall or early winter, and with good care and plenty of food, they will very commonly have lambs twice a year. From the experience had with them, the writer is satisfied that the ewes, very liberally fed, will accept the male when their lambs are only eight or nine days old. They are extremely good mothers, taking the best of care of their lambs, have large udders, giving a large quantity of rich milk, which enables their lambs to grow very rapidly. One ewe belonging to the writer dropped a lamb which weighed seventeen and a half pounds at birth, fifty-two pounds at six weeks old, and 105 pounds when weaned at three months old. All have horns, ewes as well as rams. The rams' horns are large, making two or more full turns, are heavy, like the Merinoes, but more finely wrinkled. The ewes' horns are not large, rarely making more than a half circle, are quite flat, and not ungraceful. The ewes are quite independent and often pugnacious. They are sometimes found with horns so locked as to require assistance to separate them. Although they are not "dog proof" they are much more valiant than other breeds, and an old Dorset ewe, with lamb by her side, will drive almost any kind of a dog from the fold. In their native home they are never housed, drop their lambs in the open field from November to February, and often amid the sleet and snow. No other breed have shown so much vitality. From two to five per cent. is considered a large loss even in a bad season. Dorset Horns are the sheep which produce the bulk of lambs for the early London market, although many are kept over and fattened for the following Christmas market, and in both cases, bring the top prices.

In this country no other breed has proved so successful for crossing on native ewes for the production of mutton growers, and as sires for early lambs for winter market they stand alone. The writer raises about 800 each year for this purpose, and has tried nearly every breed as sires to cross on the so-called "Michigan" Merinos, but none has given such good results as the Dorset. In the summer of 1890, I put with a flock of 126 ewes, three rams, one each of Shropshire, Hampshire and Dorset, all faring alike. When the lambs came, of the first sixty, only three had black faces, and of the whole crop, more than three-fourths were Dorset crosses, and a much larger proportion of the twins showed Dorset blood. Besides, the Dorset were much more vigorous and "up and at it" soonest. At the Fat Stock Show at Chicago in 1886, Mr. Valaney E.



PRIZE-WINNING DORSETS.

Fuller of Canada showed five ewes with lambs by their side, but these were returned to Canada. The first owned in the United States were bought by Wm. Daley of Lockport, N. Y., of Mr. Fuller in March, 1887. The first direct importation to the United States from England, were twelve by the late Adin Thayer, then Treasurer of the New York State Agricultural Society, which were brought to his farm at Hoosick Falls, N. Y., in June, 1887. The next were in July, 1887, by the late E. F. Bowditch of Framingham, Mass. The next importations were in August, 1887 by Robert J. Buck of Bridgeton, N. J., and by Woodward & Jaques of Lockport, N. Y., in September, 1887. These were the only importations in 1887, and altogether did not number over 200. Since then many have been imported. The accompanying illustration shows the ram and ewes which won first prize and sweepstakes at the New York State Fair at Syracuse in 1891, and also the same prizes at the Detroit International the same year. They are typical and fine specimens of this breed. The ram shown, "W. & J. Billy," was imported in 1887, as a yearling, and is a grand sheep. He is remarkably strong, where the Dorset is very apt to fail, just over the back, behind the shoulders. On his way from importation, he was shown at the New York State Fair, and, although there was no class for Dorsets, he was highly commended. In 1889, at the Detroit International Show, he was shown in competition with "Royal Windsor" which had, that year, won first prize at the Royal Agricultural Show of England, at Windsor, and was said to have won first at every fair where shown, yet "Billy" won an easy first over him. "Billy" has been shown at very many of the leading shows each year, and has never been beaten.

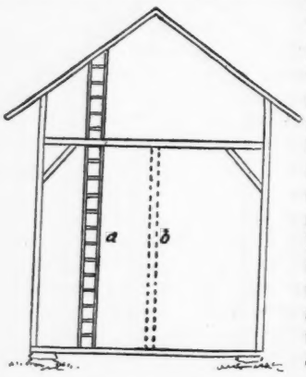


FIG. 1. LOCATION FOR A PERMANENT LADDER.

PERMANENT LADDER FOR THE BARN.

L. D. SNOOK, NEW YORK.

Barns that were constructed years ago always had a ladder permanently affixed to them so that the top of the beam could be readily reached from the floor. But the ladder was in the middle of the barn, and now that the modern threshing machine is used it is always in the way. In many improved barns of to-day there is no permanent ladder, and access to and from the mow is had by a portable ladder that is liable to, and does, often slip, endangering the life and limbs of the workman. A permanent ladder may be securely spiked to the beam, floor and rafters at about the point *a* indicated in Fig. 1. Thus located, it does not interfere with the use of the horse hayfork, and is not in the way at threshing time; *b* indicates the location of the ladder in the center of the barn. Make the side and rungs of good, sound material, so they will easily support the weight of a heavy man. In Fig. 2 is shown the method of making a ladder. The bottom, top and middle rung of a common ladder should have their ends fitted into a mortise and secured by a wooden pin, as shown at *e*. This prevents spreading and consequent loosening of the rungs. A very strong ladder is made with square rungs, the ends fitted into the side of uprights, as seen at *h*. They should fit closely and be firmly nailed in position. Many prefer this to the common ladder. Every farmer should be equipped with a portable ladder long enough to reach the roof of the highest building on the premises. Keep it under shelter and convenient for instant use in case of fire. The best place for this is under the projecting eaves of some low building, as shown in Fig. 3, where it is readily accessible, protected against rain and sun, and not in the way of men or teams.

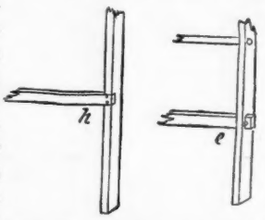


FIG. 2. MANNER OF CONSTRUCTING LADDERS.

A New Weed.—A field in the central part of New York State has been taken possession of by the "Beards-tongue" (*Pentstemon lævigatum* var. *Digitalis*. Gray), and it seems to be spreading rapidly. This plant is showy in flower, having many white tubular blossoms borne at the top of a stem that attains to the height of four or five feet. This plant is a native of Pennsylvania, and, in some unknown way, as with many another weed, has found its way to a new locality, and gives strong indications of a mischievous nature. All possible efforts should be put forth to check, if not eradicate, the pest.

THE MANUFACTURE OF CONDENSED MILK.

JAMES K. REEVE, OHIO.

The coöperative creamery, when started without the investment of a needlessly large capital, and prudently and economically managed, has generally proved a success. It has benefited many farmers by giving them a better return for their milk than they had ever received by manufacturing butter in the home dairy. There is another possible outlet for our dairy product, though it seems to have been overlooked, which is certainly capable of extension, the coöperative principle can be easily applied to it, and it would probably give a better profit than either the butter or cheese factory.

The industry to which I refer is the manufacture of condensed milk. There are now less than a dozen factories engaged in this industry in the United States, and all of them, so far as I can learn, are running to their full capacity, and finding a ready market for their product at good prices. I visited one of the most recently established of these a few days since, and found that, whereas they began less than three years ago by handling ten thousand pounds of milk per day, they are now receiving and using forty-five thousand pounds. The method of manufacture is simple, consisting of condensation by evaporation in vacuum kettles, and

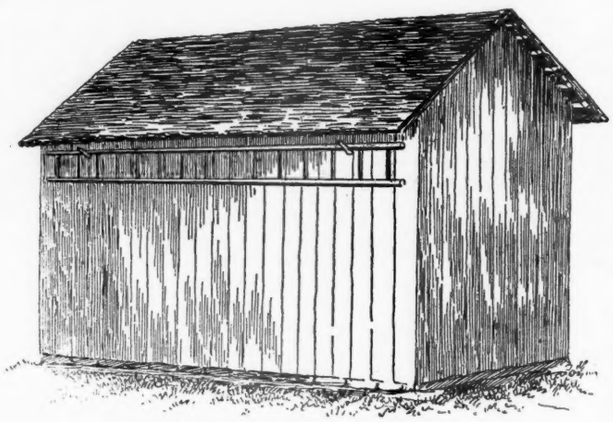


FIG. 3. LONG LADDER UNDER BARN EAVES.

the addition of sugar. The plant need not be expensive, as little of the apparatus and machinery is either heavy or costly, the principal outlay required being for the vacuum pans.

The milk for the factory which I visited is gathered by wagons going over regular routes each day, the same as for a creamery. The price paid for milk delivered at the factory ranges from seventy-five cents per hundred pounds to $1.25 per hundred pounds, according to the season. Different grades are produced, the best being that from which three-fourths of the water has been removed by evaporation. Taking this as a basis the 45,000 pounds of milk received would give at least 11,250 pounds of condensed milk daily. Add to this the 7,000 pounds of sugar that the factory is using daily and we have a total product of, in round numbers, 18,000 pounds of the finished product. This has cost for material, say:

45,000 pounds of Milk @ 1c	$450.00
7,000 " " Sugar @ 4½c	315.00
Total,	$765.90

The manufactured product is worth on an average, at wholesale, 12½c per pound can:

18,000 pounds @ 12½c	$2,250.00

To this cost must be added the expense for labor (which is not great) the cost of tins, and the interest and wear of the plant. Any estimate would, of course, be mere guesswork, but my observation leads me to believe that these items would add but a small percentage.

The business is confined in so few hands that there is no ruinous competition. There is a steady market and one that bids fair to grow now that we are coming into more direct relations with our neighbors to the South, who are the principal buyers and consumers. Little is known about the business in a general way,

those who are engaged in it considering its secrets good enough to keep, and it was only with the utmost difficulty that the above information was obtained. A dairy district that could furnish enough cows to run such an establishment on a large scale might take the business up on a coöperative basis with good results. It, of course, goes without saying that some skilled labor would be required, and that business tact and experience of a high order would be needed in the management. With these it would undoubtedly return a much better profit than the coöperative creamery.

SECTIONAL PLOW BEAM.

S. BARRINGTON.

In plowing earth from trees, grapevines, berries, etc., with the common plow, considerable trouble is incurred and usually much damage done to the growing tree or vine. To prevent this, many

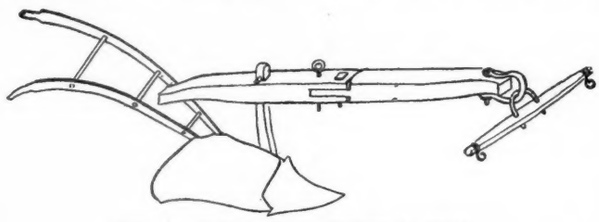


FIG. 1. PLOW WITH SECTIONAL BEAM.

farmers in fruit-growing sections who have a wooden-beam plow have made a joint in the beam, as shown in Fig. 1, and more clearly in Fig. 2. The joint should be made within one foot of where the iron standard is secured to the beam. The tongue of the joint is

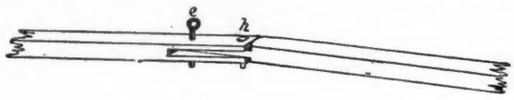
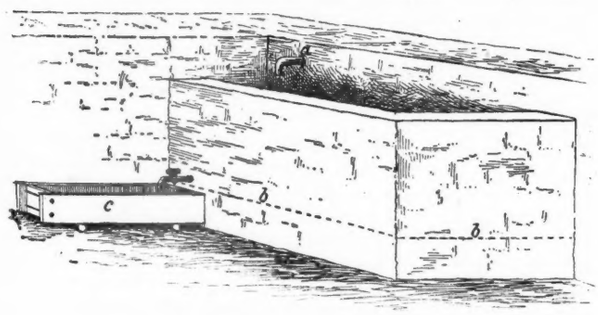


FIG. 2. SECTIONAL PLOW BEAM.

eight inches long; a three-quarter-inch hole is made near the shoulder, in which is placed a closely-fitting bolt, *h*. A series of holes is also made in the tongue near the end in which a bolt or iron pin, *e*, is inserted, which holds the beam at different angles. With the horse walking in the furrow, the end of beam is directly behind it, and not scraping off the bark or mutilating the trees and vines. Plows thus arranged by farmers themselves have been in use for many years, and are found to be a desirable arrangement. When the sections of beam are placed in a straight line, the plow is again ready for common work.

LOCATION OF CISTERN IN BARN BASEMENT.

Where it is desired to have a cistern at the barn, it is better to locate it above and not under ground. The accompanying illustration, engraved after a sketch from L. D. Snook, will give an idea of this. There will be no need of a pump nor any exertion to fill the trough. It is economy to construct the cistern wall at the same time that the outer and foundation walls of the building are laid, but the wall may be built of stone, or brick laid in water-lime mortar after the building is finished. For a hundred-barrel cistern the



CONVENIENT BARN BASEMENT CISTERN.

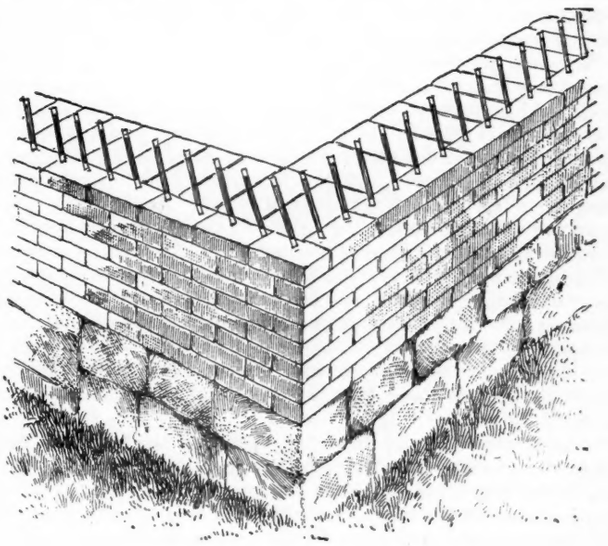
two outer walls should be one foot thick, but the inner walls resting against the basement need not be over eight inches in thickness. The bottom of the cistern is filled in with stones, or well packed earth, to the depth of eighteen inches, as indicated by the dotted lines at *b b*, and the whole is thoroughly plastered with cement mortar. The inlet pipe may be placed at *a*, as indicated in the engraving, while the outlet pipe is near one corner, and is provided with a stopcock. The watering trough is seen at *c*. An overflow pipe can be located at any point within two inches of the top of the cistern and should have one-third greater capacity than the inlet pipe, thus preventing all danger from overflowing. The top of the cistern may be covered over with boards, if desired. If necessary, pipes can be laid from the cistern to any part of the basement and other watering places established.

COMBINED BRICK AND ADOBE WALLS.

J. L. TOWNSHEND, UTAH.

To cheapen the cost of buildings erected with brick walls, it has become the custom in Utah to build with brick and adobe combined. The exterior is laid of brick in the usual way, omitting the courses of headers, which are unnecessary, and this part of the wall is usually the thickness of a single brick or about four inches. The brick is backed by from one to two layers of adobes, according to the strength of the walls desired. First, eight courses of brick are laid, and these are backed with six courses of adobes, the brick laying four courses to the foot and the adobes three, so that eight courses of brick and six of adobes come level on top. To tie these together, strips of thin strap-iron an inch wide and about one foot long, with the ends for an inch doubled flat to secure the hold are laid diagonally across the wall, one piece to each brick, and more if considered necessary at the corners. Eight courses more of brick, with a backing of six courses of adobes, are laid on the wall and tied in the same manner with strap-iron until the successive additions make the wall of the height desired. The usual size of a brick in this locality is eight and one-half by four inches and two and one-half inches thick. The size of the largest adobes is eleven by five inches and three and one-half inches thick when dry, though many other dimensions are in use.

Farmers who can make their own adobes find the above combination cheaper than to construct their houses of lumber. These houses will be very durable even in moist climates, and possess one great advantage over solid brick walls, for adobe walls never sweat



COMBINATION BRICK AND ADOBE WALL.

or show the least moisture. They are warm in winter and cool in summer. They may be laid with a mortar composed wholly of clay and sand, and plastered with the same where it is an object to save the cost of lime mortar. The illustration shows how a combined wall is put together, when the sixth course of adobes, laid as headers, is secured to the single thick brick facing by strap-iron.

Cotton Seed and Color of Butter.—Much has been said concerning the influence of feeding cotton seed to cows upon the color of the butter made from the animals. Butter makers throughout the South will, therefore, be pleased to learn that from elaborate experiments carried out at the Alabama station the conclusions are that no change of color was observable in the butter from feeding either cotton seed or cotton-seed meal. This is a matter of no little importance for the rapidly increasing dairy interests of the South.

THE REAL USEFULNESS OF LIGHTNING RODS.*

Franklin, as it is well known, was the first to prove the general identity of lightning with the electricity of the friction machines of his times; and we are all more or less familiar with the discussions and arguments for and against the erection of lightning rods that followed his invention (for invention it was) from 1755 until 1780. Beyond any doubt, Franklin proved his case, the rods did protect buildings, and, say what his opponents might, the facts were against them. Buildings, that had conductors on them, which were struck by lightning, suffered but little damage, compared with those which had no conductors. So evident was this protection, that towards the end of the eighteenth century almost all the prominent governments of the world had organized boards or committees to look after the erection of lightning rods upon powder magazines, as a means of protection from damage by lightning.

But there was still, in many quarters, some doubt as to whether lightning rods were effectual protectors, and there were cases in which the rods did not seem to save the buildings, to which they were attached, from being struck. But a famous French board of experts (Leroy, La Place and Coulomb), in 1789, after considering the arguments for and against the erection of lightning rods concluded that both experiment and observation proved the wisdom of erecting them. They even went a little farther and said that not only were the rods effective, when well constructed, but that even when they were more or less defective in construction they were of value in conducting the lightning. This was directly opposed to an opinion then and since prevalent, that a poor lightning rod was worse than none at all. The chief defects likely to occur were, in their opinion, a blunted point and a break in the continuity of the rod, this latter including a poor "earth."

At this point let us say a word as to just what the function of the lightning rod is. Many can only see the one function, that of conducting the electricity to the earth, should the lightning happen to strike close in the vicinity. This is, indeed, one of the purposes of the rod, but the less important one, we think. The prevention of the disruptive discharge by silently neutralizing the cloud electrification is the chief function. This is why a rod is pointed and why points, in good connection with the ground, are always so desirable upon buildings. They are, indeed, somewhat like small water pipes connected with a vast reservoir. If you have enough of them, you may drain the largest reservoir dry; or, if there were danger of a disastrous break or overflow, owing to some sudden rise in the height of the water, these small pipes might do effective work in keeping the height down until the immediate danger is passed. The rod or conductor, on the other hand, is like some large main which is closed until the flood occurs, which we then interpose in the path of the torrent, trusting to its ability to safely carry the overflow away. Sometimes it does. In perhaps nine cases out of ten, the lightning conductor, if it be such a one as we will describe later, does carry the flash; but there are cases of very heavy discharges in which overflows may still occur. To carry the lightning flash, the "lightning conductor should offer a line of discharge more nearly perfect and more accessible, than any other offered by the materials or contents of the edifice we wish to protect." To prevent the discharge, "the conductor should be surmounted by points."

These quotations are from the Report of the Lightning Rod Conference, which consisted of delegates from the Meteorological Society, the Institute of British Architects, Society of Telegraph Engineers and of Electricians, the Physical Society, and some distinguished coöpted members. If certain conditions laid down in the report are carried out, "if the points be high enough to be the most salient features of the building, no matter from what direction the storm cloud may come, of ample dimensions, and in thoroughly perfect electrical connection with the earth, the edifice with all that it contains will be safe, and the conductor might even be surrounded by gunpowder in the heaviest storm without risk or danger. All accidents may be said to be due to a neglect of these simple elementary principles. The most frequent sources of failure are conductors deficient either in number, height or conductivity, bad joints or bad earth connections. There is no authentic case on record where a properly-constructed conductor failed to do its duty." This is the verdict of the conference, certainly representing the best opinions up to 1885. As to the assaults made upon this position in 1888, 1889 and 1890 by Dr. Oliver Lodge, we will have something to say further on.

To resume the historical narrative: The next noteworthy investigation was that of La Place Rochon, Charles Montgolfier and Gay-Lussac, in 1807. This report states that where there are points, or considerable metallic masses, they should all be in connection with the rod. Experience, it was claimed, proved that an iron rod four-fifths of an inch square, would carry the most violent discharge of lightning. Too much care could not be taken in making good the ground connection; moist earth, running water and charcoal being recommended. Especially at this time, although it had been raised long before, and still prevails in some quarters, was discussed the question of the possibility of the rod and metallic masses attracting the lightning, thus increasing the danger. It was decided that it was true that such buildings were more likely to be struck. We cannot go in detail into this question, but it is our opinion, and we think it can be clearly shown, both experimentally and by many observations which we have made, that for all practical cases, such conditions would have very little to do in determining the path of the discharge. We consider the statements very erroneous, which we have seen in even some recent papers on lightning, that the path of least resistance will be the path of the flash. It is true that when the air is strained by being subjected to electrifications of cloud and earth, the weakest spot gives away first, and this is apt to be in line with some small elevated knob or surface; but it is equally true, and is perhaps the more general case that when a really vigorous disruptive discharge does occur, it is somewhat, as Dr. Lodge aptly says, like an "avalanche," and our little metallic surfaces and elevated points are after all very low and insignificant factors in determining the path. The very objection that Dr. Lodge advances against our methods of testing the conductivity of rods and "earth;" *i. e.*, with a battery and Wheatstone bridge, claiming we might as well try to ascertain in advance what course an avalanche will take by letting a pint of water trickle slowly down the mountain side, comes in to sustain our position. But, as a matter of fact, we find from study of the actual cases where buildings have been struck, that lightning often entirely disregards metallic surfaces and points, and that what we really want to know, first, is whether the condition is to be one of "steady strain" or "impulsive rush" discharge. In the case of steady strain, the metal is apt to influence the path of discharge; in the case of an impulsive rush discharge, even points seem to be of little use.

And so we pass through the different committees appointed down to 1850, and the work done by Sir William Snow Harris (and let us notice right here that, despite any theory that Professor Lodge, eminent as he justly is, and capable, or those who come after him, may advance, statistics showing the rate of ships struck before and after Snow Harris' work prove beyond all question the value of the rod), and come to the great question, "What shall be the form of the conductor?" In a letter of an old British admiral, there occurs an amusing description of his being called upon to approve some specifications for a lightning conductor for a certain lighthouse. He was a believer in the surface theory of Harris, but thought he would consult Faraday. Faraday (who only saw the question of conductivity in this problem) said very positively that the solid rod was better than the tube, which would give greater surface with less copper; that solid volume was everything, superficial area nothing, and that if Harris said otherwise, "he knows nothing whatever about it." He (the admiral) straightway approved the solid rod conductor for the lighthouse. Within two or three days he met Harris, and instancing the matter, the latter said, "Surface area is most important, and if Faraday says otherwise, he knows nothing whatever about it!"

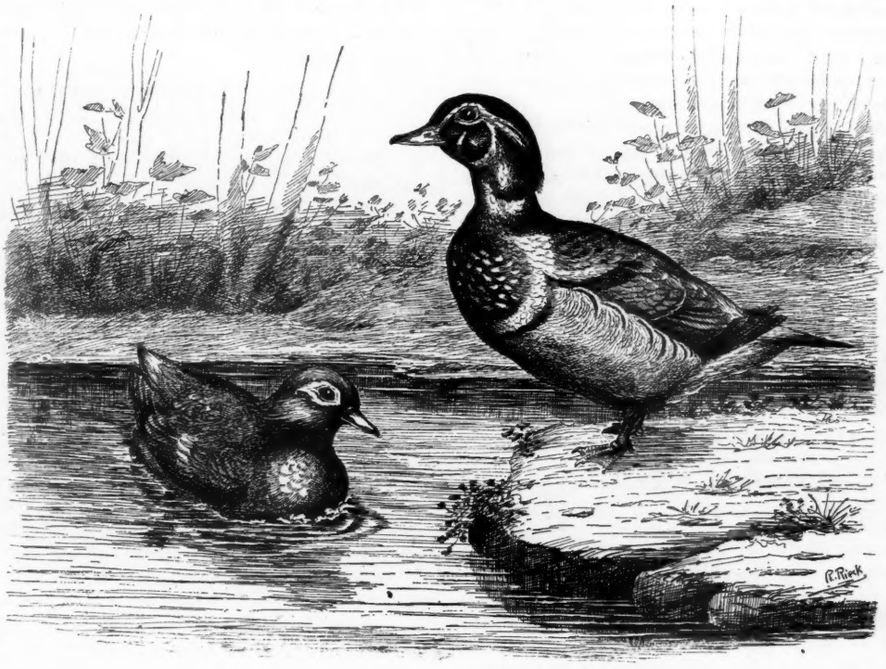
With the greatest possible regard for the genius of Faraday, we cannot help but say that the light of both modern theory and experiment tends to confirm Harris' view—which, by the way, was one founded really upon experience, he having carefully studied for years the details of the lightning's action. To a certain degree, Faraday was right, a copper rod, an inch thick, seems capable of carrying almost any flash, and is a great protector; but copper is expensive, and if the core is entirely useless, why have it?

We cannot go into details regarding this question of the shape of the rod; the reader is referred to Dr. Lodge's experiments for a great deal of most interesting and valuable information. It will be enough here to simply emphasize the fact that if an electric current flows steadily in one direction in a cylindrical wire, its intensity is the same in all portions of the wire, as shown by Hertz, but that

*This article was prepared by the Weather Bureau of the United States Department of Agriculture, for the AMERICAN AGRICULTURIST. Prof. Mark W. Harrington, the chief of the Bureau, officially vouches for it as giving "the best disinterested advice consistent with the scientific knowledge of to-day."

with a current of an oscillatory character, *i. e.*, a current which rapidly reverses its direction, this condition no longer holds, and if the direction is altered very rapidly, the interior of the wire, or lightning rod, may be almost free from the current. "This is one of the direct results," as Lodge eloquently says, "of the investigation of the propagation of electric waves in all media, the fruit which we now enjoy of the rich plantings of Maxwell, for whom, by the way, Faraday cleared the ground, and it is to be of the utmost importance in considering the action of lightning. If lightning is a discharge of an oscillatory character, and some of us think that it is, then the theory of the lightning rod, as regards all that section below the point, must be altered."

Finally, in our studies of buildings struck, we have found that a great deal will depend upon the localities. In some places, like great cities, we think the erection of lightning rods a rather useless expense, and the famous remark of Sir William Thomson, at the British Association meeting at Aberdeen, "when I urge Glasgow manufacturers to put up lightning rods, they say it is cheaper to insure than to do so," we think shows the wisdom of the manufacturers. We judge there is not a very great necessity for the erection of rods in cities. On the other hand, in the country, in exposed places, failure to erect and properly maintain good systems of lightning conductors borders on culpable negligence. Not to put proper rods on barns, for instance, is to leave an object, more or less liable to be struck, at the full mercy of the lightning when it strikes. We cannot too strongly recommend proper rods as a means of protecting farm buildings against lightning. The conditions are very different from those of a city (our statistics prove this) and the non-erection of rods, in our opinion, ought to be good grounds for forfeiture of insurance, if the building is struck. There are many interesting facts regarding the liability of buildings, trees, persons, etc., to be struck, which we have not space here to go into. Some localities have vastly more thunder-storms than others. In some localities the death rate due to lightning is quite small; in others, quite large. In Prussia, the risk in rural districts is about five times greater than in city districts. In the city of Berlin the number of fires, caused by lightning, averages per year only from 0.2 to 0.3 of one per cent., a very small ratio. We find from the "Chronicle" fire tables that in six years, 1885-1890, lightning is said to have caused in the United States 2,220 fires, or 1.3 per cent. of the whole number. The loss amounted to something like $8,387,000. There is also considerable difference in the relative frequency with which the various kinds of trees are struck, the oak being most, and the beech less, frequently struck.



PAIR OF NATIVE WOOD DUCKS.

Detasseling Corn.—The process of detasseling corn consists in removing the upper portion of the stalk to which the spray of male or pollen-bearing flowers is attached. Several experiments have shown that it increases the crop to remove the tassel from fully one-half of the stalks before the pollen is shed. The results of some extensive tests made by the Nebraska Experiment Station, show the opposite effect. There was a uniformly lessened yield upon the plats when one-half of the stalks were detasseled. Similar results obtained when the tassels were removed after the pollen had been matured and scattered. In view of these results, it does not seem wise to interfere with nature for profit's sake.

THE WOOD DUCK.

H. S. BABCOCK.

The Wood, or, as it is otherwise known, the Carolina or Summer duck, is one of the most beautiful of the aquatic fowls, and is only surpassed, if at all, by the Mandarin, to which it bears a considerable resemblance. The plumage of the male is most gorgeous and varied. The adult drake has a red bill, with a black margin extending nearly to its tip, and with a black spot between the nostrils. The eye is orange, the front and crown of the head, with its crest, is of a rich, bronzy-green hue, running into violet, and marked with a white line, extending from the mandible over the eye, and with another white line starting back of the eye. The throat is marked with a crescentic white collar, the points of which extend nearly to the rear of the eye. The cheeks and the sides of the upper part of the neck are violet, the breast of claret color, marked with small white spots, increasing in size as they extend downward. The lower part of the body is white. At each side of the breast, near the shoulder, is a large white crescent, immediately back of which is a broader one of black. Beneath the wings the body is marked with fine, wavy, parallel black lines upon a ground of yellowish drab. The flanks are variegated with broad, semi-circular white bands, shaded with black. About the sides of the vent the color is light violet. The long, hairlike tail coverts are deep black, tinged with yellow. The back is dusky bronze, with a green tinge. The scapulars are dark green and purple. The tail is black, with green gloss above and dusky below. The wing-spot or *speculum* is green and blue. The legs and feet are of an orange color. The duck has a small crest, much smaller than the drake. The head and neck are a dark drab; the breast a dusky brown, marked with white spots; the back and a portion of the wings a dusky, bronzy brown; the wing-spot like the male, but less brilliant; the chin and throat white, and the bar behind the eye white. While beautiful in plumage, it is a beauty of a more sober kind than that which her mate possesses. The tail of the birds is rather long, and the feet are provided with strong, hooked claws, fitted for grasping the limb of a tree. Indeed, these birds derive the name Wood duck from the fact that they flit about in the woods, and build their nests in the hollows of old trees. Their flight is strong, well-sustained, and nearly noiseless.

The nesting time of this duck is in the months of April, May, and June. They lay only a few eggs, oval in shape, and in color closely resembling polished ivory. They can be bred in confinement, but only under most favorable circumstances, and, though deservedly kept by many fanciers abroad, and by a few in this country, the rearing of them is a delicate and difficult operation. The Wood duck, at the best, has never been more than half domesticated. Its great beauty, however, would seem to warrant much care in the attempt to make of it a thoroughly domesticated fowl, as has been done with the Rouen duck, evidently the lineal descendant of the wild Mallard.

Though the adult Wood drake is dressed in such gorgeous plumage, he has his period of humiliation, like the Rouen and Mallard, for about June the plumage begins to change, and from then until about September he is dressed in the livery of his soberer-hued mate. But, with the return of the crisp air of autumn, he again bedecks himself in his gay colors, not to change them until the

approach of the heated term. The Wood duck is small in size, but, if it were thought desirable, could probably be considerably increased in size under domestication. If the heavy Rouen could be bred from the Mallard, there is no reason why the domesticated Wood duck might not be made to reach a much larger size than it has at present. For ornamental purposes, pure and simple, the smaller the duck the better, but, for practical purposes, an increased size would be desirable. It will be a long time, however, if ever such a time arrives, before the Wood duck enters into competition with the Rouen, the Pekin, the Aylesbury, and the Muscovy, as a practical and profitable aquatic fowl.

The period of incubation of the eggs is twenty-five days. In the wild state, according to Audubon, the young, when hatched, if the tree containing the nest is placed immediately over the water, "scramble to the mouth of the hole, launch into the air with their little wings and feet spread out, and drop into their favorite element; but, whenever their birthplace is some distance from it, the mother carries them to it, one by one, in her bill, holding them so as to not injure their tender frames. On several occasions, however, when the hole was thirty, forty, or more, yards from a pool or other piece of water, I observed that the mother suffered the young to fall on the grasses and dried leaves beneath the trees, and afterward led them to the nearest edge of the next pool or creek." The Wood duck bears confinement well, and increases in beauty with age, as the crest grows to a larger size, the markings become more pronounced, and the luster of the plumage improves.

This interesting duck is found in various parts of the country, and some beautiful specimens are annually shot in the State of Rhode Island, and mounted by local taxidermists. They are usually found in pairs or in small flocks in these days, but Audubon states that he has seen them in flocks of hundreds, and known fifteen to be killed at a single shot, something that even the most elastic imagination of our modern Nimrods has not ventured to conceive. When Audubon wrote, the country was less densely populated, and all game was more plentiful. It is not, therefore, intended to discredit the accuracy of his statement. As the population increases, this beautiful fowl will tend to grow scarcer still, unless it is propagated by man in a more or less domesticated state. Its great beauty ought to stimulate breeders to seek for its preservation by concerted and sustained efforts at domestication.

ARTIFICIAL HATCHING OF BROILERS.

CHARLES R. BUCKLAND.

In the March number of the AMERICAN AGRICULTURIST is an article by John W. Caughey, of Pennsylvania, on the extent of artificial hatching. Mr. Caughey says: "A flock of 400 broilers would pay a handsome profit over the cost of raising, when selling for from $1.50 to $2.00 per pair." This may be misleading. In the first place, not one man out of a thousand who raises broilers gets the full retail price above quoted, but is doing remarkably well if he could average $1.00 per pair during the whole of the broiling season. The writer has had personal and practical experience in this business. In the town of Hammonton, N. J., numbers of people have lost their money, and retired from the business, and this season there are probably fewer broiler establishments in running order than have been for many years past. It is an exceedingly risky and difficult business.

Take a flock of 400 broilers, as stated by Mr. Caughey, for March and April markets. The grower will first need to set his incubators in November, so as to have broilers for March. This year, what were supposed to be the best fresh eggs, were sold at thirty-two cents per dozen in Hammonton. These eggs are bought from different farms, and of course cannot be guaranteed, and if fifty per cent. of the whole are hatched out, it is doing remarkably well. For 400 broilers then, one would need 800 eggs, at a cost of $25, besides more to allow for loss in growing chickens through the many diseases and ailments to which they are subjected. This is, in fact, a very conservative estimate. In addition to this, there is generally a cost for labor, time and horse hire in driving around to collect the eggs. The old story that broilers can be raised and put on the market in two months is not based upon the actual facts of the case. There may be a few stray chickens that will be ready within that time, but it requires excellent care and good feeding to have them ready within three months.

In my own experience I kept a precise and accurate account of every item of expense, and find that chickens cannot be fed at a less cost than one and a half cents per week each. To even arrive at this figure I allowed only the lowest wholesale price for every article fed them, which had been raised by myself, such as potatoes, truck and corn. The cost of feeding 400 chickens at one and a half cents per week, would be $6 per week, or $78 for three months. This does not allow anything extra for feeding the many that die. One ton of coal, at $5.25, will last three weeks, needing, therefore, four tons for three months, or $21. Coal oil will cost $1. Killing and picking for market, at four cents each, is $16 (the usual price is five cents each). A good broiler farm cannot be rented if fitted up properly with heaters, brooder houses, and incubators for less than $10 per month, which adds $40 more to the expense.

Here we have a total expenditure of $165, based on the very lowest estimate. The raiser of broilers will not get more than $200 for his 400 broilers. Even if he gets that, after deducting commission and his own expense for hauling to market, he is doing well. In the estimate for feeding is allowed the cost of bone meal, meat, all kinds of grain and mixed feed, charcoal, potatoes—in fact, everything that can possibly be required at wholesale prices—and, as retail prices nearly always have to be paid for such things, my estimate may be considered an exceedingly low one. The foregoing shows a balance of $35 left to pay for time and labor during 120 days, being at the rate of thirty cents per day. If the broiler raiser got this much out of the 400 broilers he might congratulate himself, but he certainly would not receive "a handsome profit over the cost of raising."

POULTRY JOTTINGS.

JOHN W. CAUGHEY, PENNSYLVANIA.

Breeding at five dollars a head, Plymouth Rock fowls ought to pay any farmer. I know of one who gets this price for his high-bred birds. It costs him no more to rear them than the common barnyard mongrels.

Many farmers neglect their opportunities. They ought to know that hens will pay as well as their cows, sheep or hogs. Eggs are always salable at a profit in summer, the farmer can either sell or store them for higher prices. In eggs alone he can be assured a very fair income.

Poultry, small fruits and bees work harmoniously together. On a plat of fifty acres a perfect paradise could exist under proper management. A better living, more happiness, peace and contentment can be derived from such a life than is enjoyed by some of the richest merchants.

Sulphur is often given to fowls in excess as a preventive of sickness. A very moderate quantity may be given to them during the moulting season with excellent results, if the weather is dry. If wet, sulphur fed to chickens makes them lame and rheumatic. Actual cases have been directly traced to it.

Green cornstalks, lettuce and other garden greens, should be cut up fine and given to fowls confined in yards. When deprived of it hens lack the red color in their combs and the blood will become impure. The result is a number of dead fowls some morning. Green food is essential to their health.

In many parts of Mexico the better grades of poultry are now being introduced, yet on the majority of the farms, a pure-bred Brahma or Plymouth Rock fowl would indeed be a curiosity. Like their methods of tilling the soil and harvesting their crops, they are a century behind the United States in poultry raising.

Ducks hatched by incubators are ready for market at ten to twelve weeks old. Wild ducks have become scarce. As the tame are nearly the equal of the wild duck in flavor, the demand is usually excellent and prices considerably beyond those paid for chickens of the same age. To obtain the flavor of the wild duck, feed them with celery chopped up fine as part of the food the week before they are marketed.

The great difficulty with many who start into rearing poultry for profit is that they want to earn big profits from the start. If this does not materialize, they become discouraged. Many also start with a meager capital, forgetting that time means expense, and a small amount will not suffice, should unseen delays occur. Capital, good judgment and determination to succeed, are the essential qualifications.

Minorca fowls are now considered, as egg producers, next to the Leghorn. Their appearance would indicate great laying qualities. The hen's comb hangs down much more than some of the best Leghorns, making it appear quite odd when approached on the side to which the comb droops, covering the bird's eye completely. They are quite hardy, more so than the White-faced Black Spanish to which they are related.

THE RUSSIAN FARMERS AND THE FAMINE.

F. C. CHAPPELL.

It is commonly supposed that the present famine in Russia is quite an exceptional event. True it is that Russia is not visited at short intervals with such catastrophes, but it is known to people who have traveled much in the country that Russia is always more or less affected by what is called "land-hungers." The present famine, terrible as it is, is indeed only one of many similar visitations which have fallen upon the unhappy agriculturists. The peasants are always in a state of chronic destitution. Sometimes, as now, it becomes acute, and at other times it is chronic. The present suffering would not have become known had not an enterprising journalist taken it into his head to "boom" the Russian moujik's wretchedness. The peasants suffer, live and die. They have done this for hundreds of years, and will probably continue to do so for centuries to come.

The bulk of the population of Russia is composed of agriculturists. The two good harvests which preceded the year 1889, had improved, to some degree, the material condition of the population. The years 1889, 1890, also — to a slighter extent in some places — 1891, were distinguished by bad harvests, and inferior yields of grain. These events once more reduced the farmers to a state in which the payment of taxes and the satisfaction of their ordinary wants was attended with considerable difficulty. The lessened consumption of tea and sugar and similar "luxuries," as they appear to the Russian moujik, together with the greatly reduced demand at the fairs of Nijni, Novgorod and Kharkoff, indicated very clearly that the people were feeling the stings of poverty. Taxes borne by the rural population had also been accumulating, although the Russian tax gatherer is about the keenest of his kind in getting in the taxes. These things all show the decadence of the population from the comparatively prosperous times immediately preceding 1889. Trustworthy figures for the past year are not yet available, so far as the grain trade is concerned, but some idea of the unsatisfactory harvest of 1890 will be gathered from the fact that the exportation of grain from St. Petersburg and district was reduced to the extent of 62,678 tons, as compared with 1889; and compared with 1888 the export of grain was smaller by 194,437 tons. The high rate of exchange had, of course, an adverse influence.

After 1890, the material condition of the agricultural classes sank lower and lower. The Peasants' Land Bank soon found it necessary to curtail its operations, owing to the alarming growth of arrears in the payments of interest, and the increasing quantity of land which the bank had to take possession of in consequence of non-payment by the purchasers of the interest on the money advanced for such purchase by the bank in question. The report of this institution, up to December 1, 1890, states that no less than twelve per cent. of the land, for the purchase of which the bank had advanced the money, had lapsed to the bank, owing to the inability of the peasants to meet their liabilities in regard to it. In addition to this, arrears of peasant payments to the bank amounted, on the above named date, to about $5,989,500. The estimated clear loss incurred by the Peasants' Land Bank through the remissness of its creditors, and on sales of mortgaged lands amounted, towards the end of 1890, to almost $198,500. During the eight years of its existence the bank had advanced by the end of 1890, $29,925,000. It is also stated that the rate of interest, amounting to seven per cent., charged by the bank on its advances, and the standard of those advances varying from seventy-five to ninety per cent. of the value of the land, which, moreover, does not generally yield more than five per cent. under peasant cultivation in the best districts, would also account, to some extent, for the present unfavorable condition of the bank. The Imperial Nobility Land Bank advanced on mortgage of estates in 1890 some 61,750,000 roubles. Only eighteen estates were sold by the bank in default of payment of interest on money advanced. In May, 1891, no less than 1,350 estates were

GRAIN THRESHING IN RUSSIA.

advertised for sale by the bank! Most of the sales, too, were in the most favorably situated districts in regard to soil, climate, etc.

Years of misery and oppression have degraded the moujik to an almost incredible state of apathy and stubbornness. He is undoubtedly very lazy, very improvident and often morally dissolute. This moral debasement is shown at this time, in the fact that some fortunate peasants who have reaped a fairly good harvest have secretly carried their grain to the neighboring government for sale; afterwards they have claimed their share of the public relief, formally attesting their appeal, and through the Volost, under falsely sworn oaths. Lying is prevalent everywhere. In many places the peasants, instead of selling their grain have secreted it and declared themselves destitute. This is done in the very face of intense misery, where whole families are absolutely dying of hunger. The Kursk-Voronish railway has offered work sufficient to supply a livelihood during the winter to all the peasants in its locality. The company offered twenty-three roubles per month to each laborer, and for a man and horse thirty-five roubles. This is reckoned fair wages, while all necessary tools, etc., are found by the company. This offer has been rejected by the bulk of the peasantry, only a few of the most thrifty accepting it. The others prefer to beg. Similar offers of work by landowners are treated in the same way. The peasants know that the government will make provision for them, so far as it can, and they trust to Providence for food, and indeed, for everything else. The governments of Kazan, Samara, Simbirsk and Orenburg are the principal sufferers from the famine. In Samara, each person, excepting men capable of working, and children up to two years of age, receives thirty pounds of corn for a month. This may last twenty days, and during the other ten days the recipients starve.

As regards the price of labor, I may say that wages ruled low last year in Odessa, Taganrog and adjacent districts, a result of an abundant supply. The best prices paid were in Astrakhan and Stavropol, namely, $0.38 per day, the man paying his own board and $0.28 per day, living at his employe's expense. The average wage per day in the southeastern provinces was $0.28 and $0.26 for men, and $0.21 and $0.15 for women per day. The Russian government is taking all possible means to improve the condition of the agriculturists in Russia, in order to enable it to compete more successfully in the grain markets of Europe. The erection of grain elevators, agricultural banks, technical agricultural schools, reduction of railway rates for the transport of farm produce, exhibitions —all these plans are contemplated by the government. Several elevators have already been erected, but the other schemes named have yet to be put into practice. Perhaps, like many similar attempts at reformation, they will get no further than the projected stage.

[The accompanying illustration is from a photograph specially taken for the AMERICAN AGRICULTURIST, showing a Russian homestead with peasants at work threshing grain on a farm in the village of Kuntzora, near Moscow.]

PROFITABLE PIG FEEDING.

How to pay five and one-half cents per pound for 150-pound pigs, feed fifteen bushels of forty-cent corn, making them weigh 300 pounds, and sell at three and one-half cents to make any money, is a conundrum proposed by J. G. Holt, Henry Co., Ind. A 150-pound pig at five and one-half cents, would cost $8.25; sold when weighing 300 pounds, at three and one-half cents, it would bring $10.50, leaving $2.25 to pay for the fifteen bushels of corn, or fifteen cents per bushel.

The only way to make money in feeding pigs is to comply with the laws of animal physiology. In feeding a 150-pound pig up to a weight of 300 pounds, the average live weight is 225 pounds, while the average live weight of a 150-pound pig is only seventy-five pounds. Now the maintenance ration is in proportion to the live weight, so that the food used—lost so far as making pork is concerned—is three times as great in the larger as in the smaller. Suppose there had been put up a small pig, and one weighing 150 pounds for pork making, keeping them in warm quarters and well supplied with everything required for comfort and growth, and feeding them on the ideal pig food—wheat middlings — it will require four pounds of middlings to each 100 pounds of live weight for maintenance, and three pounds more will make a pound of meat. Now to make an average pound of gain on each, will require feed as follows: With the smaller pig, three pounds are required for maintenance, and three more for gain. So six pounds make a pound of meat. For the larger pig, nine pounds will be required for maintenance and three for gain, taking twelve pounds of middlings for each pound of pork, or two to one in favor of smaller pigs. It is a sad, though common mistake, to feed large pigs. As a rule, it is better never to keep any beyond 200 pounds.

Another mistake was in feeding a ration not adapted to the pigs' wants. While corn is one of the grandest stock foods, it is by far too carbonaceous to produce the best results in pig feeding. Had Mr. Holt used a mixture of 200 pounds corn meal, 200 pounds of wheat middlings and 100 pounds of linseed meal, he would have found greater gain in the pigs at a smaller cost, and the meat would have been more lean and desirable for human food. It also pays to have some sort of succulent food, beets, turnips, carrots or silage. This not only gives larger growth, but better quality of meat. As a rule, more money will be made out of pork to have pigs come at different times, feed abundantly, so as to keep them growing right along from the time farrowed, and sell at not over 200-pound weight. Better sell at 150 than to keep much beyond 200 pounds.

THE DISADVANTAGES OF BITTING.

JOHN KEESE, LONG ISLAND, NEW YORK.

Having used the bitting machine mentioned in a recent number of the AMERICAN AGRICULTURIST till the cruelty to the colt caused me to abandon it, I would suggest to any one in favor of it that he hold his own head for an hour in the way a colt is obliged to, and he will know what it is. I have seen horses made useless by straining up the head beyond its limit. Bitting is directly chargeable with most of the accidents by horses becoming unmanagable and running away, because their mouth and position become painful. The horse, unable to get relief, learns to plunge and run with a tight rein. In driving, if excited or frightened, he puts this lesson into practice, and plunges or runs, regardless of the driver's pull.

My practice, for many years has been, if the colt was wild, to soothe his fears, get him accustomed to the harness by putting it on two or three times, then put him with a well-trained horse, to help guide him and keep him from being frightened, as when alone. I pull him as little as possible, giving all the latitude I can until he is used to the bit, then hitch the checkrein quite loosely, and shorten day by day till his head is as high as is natural. Now, the reins being in hand, his head is kept in place much better than by the side reins of the bitting bridle, because there is no unnecessary pull sidewise, as with the fixed side rein of the bitting bridle. I use only a simple, easy bit. If at any time he tries to run, or pulls harder than I can hold, a sudden jerk on one rein, slacking the other, brings up his head, and checks him before he is aware of it. So, in after driving, no matter how much frightened or excited, a jerk on one rein reminds him of the lesson he has learned, and prevents all danger of a runaway. This never prevents holding as stiff a rein as any one wishes, if it is a steady one, and gives a good mouth. I very rarely use a whip, believing that it does more harm than good.

HORSES SHOULD WEAR LIGHT SHOES.

EDWIN C. POWELL, MASSACHUSETTS.

Horses are commonly made to carry too heavy shoes. The shoe is designed merely to protect the hoof, and the lighter it can be made and still serve its purpose, the better for the horse. Horses that are devoted to farm work, and on land where there are few or no stones, may dispense with shoes, except while the ground is frozen. This would be of great advantage to the horse, to say nothing of the saving in the horseshoer's bill. But most horses require shoeing, and the shoes worn are generally heavy iron ones. Steel shoes can be made lighter, will wear longer, and the first cost is not so much more that it need prevent their being used. Light horses and driving horses should always wear them.

For horses of 1,100 pounds weight, and with well-shaped, upright feet, the fore shoes should weigh about one pound each, and the hind ones twelve ounces. If four ounces are added to each shoe, let us see what a difference it will make. In plowing, cultivating, mowing, reaping and many other farm operations, a horse will walk from ten to twenty miles a day, and advance about four feet at a step. At each step the horse lifts a half pound extra on its two feet or 660 pounds in every mile. In a day's work of fifteen miles, the horse would lift 9,900 pounds extra or nearly five tons. If the force required to lift this five tons of iron could be expended in the work the horse is doing, much more could be accomplished. In the light of these facts, is it any wonder that when young horses begin to wear shoes, they soon grow leg-weary, have their step shortened and acquire a slower walking gait?

THE MATRIMONY VINE.

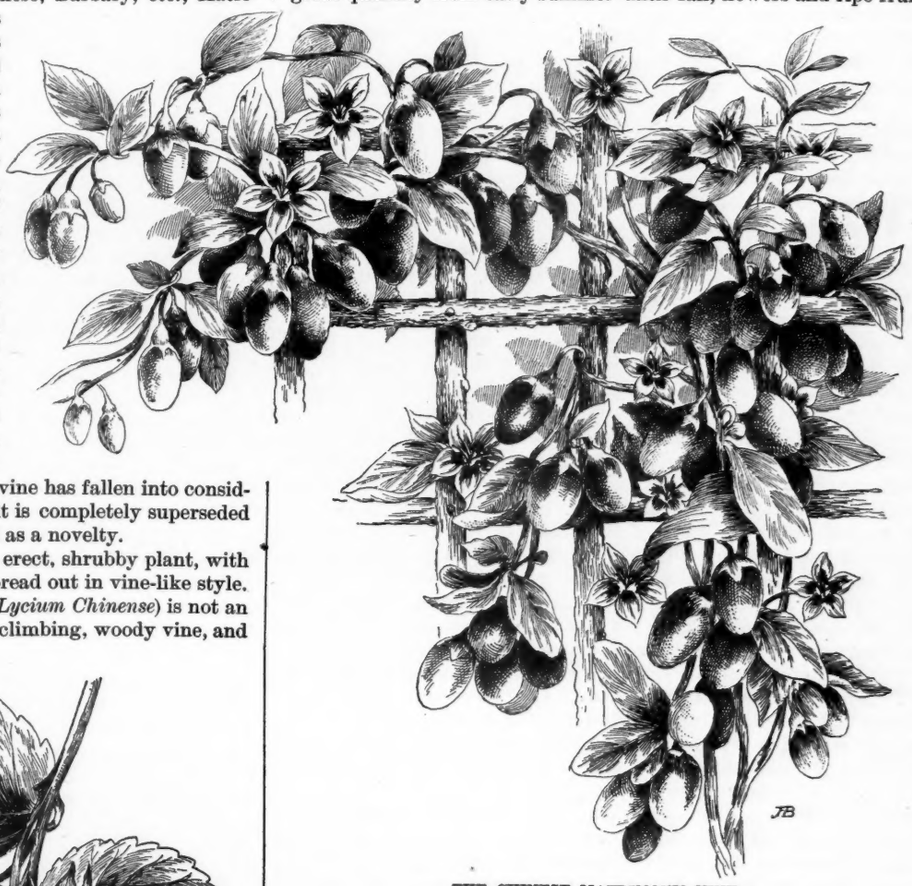
WILLIAM FALCONER.

The name Matrimony vine properly belongs to the European species (*Lycium Europœum*), which is quite a common plant in old gardens, and in many places it has become naturalized by the wayside. But the cognomen, Matrimony vine, will now probably adhere to every member of the genus, the several kinds being specifically identified as European, Chinese, Barbary, etc., Matrimony vine. This common name was given because the little purple flowers which are produced so abundantly all summer and autumn appear mostly in pairs from the axils of the leaves; but this rule is not rigid, for many clusters have three flowers. The European Matrimony vine, which is quite common in country and village gardens, adapts itself with considerable freedom to most varied circumstances. It spreads by means of suckers, the prostrate branches rooting as they lie upon the ground, the arching branches as they droop over and reach the ground rooting at the tips, and by seedlings springing up in the neighborhood of old plants. It is also propagated by means of root cuttings and stem cuttings. But in the face of the many other beautiful shrubs now cultivated in our gardens the old Matrimony vine has fallen into considerable disrepute, and in its own family it is completely superseded by the Chinese species now being pushed as a novelty.

The common Matrimony vine is an erect, shrubby plant, with long, slender shoots that arch over or spread out in vine-like style. On the other hand, the Chinese species (*Lycium Chinense*) is not an erect shrub, but rather a long trailing or climbing, woody vine, and

E. P. ROE STRAWBERRY.

it is a really desirable and highly ornamental plant, in addition to being the most valuable species of the genus. It is also perfectly hardy and of the easiest possible cultivation. It can be used for any purpose, for which a long, slender vine is adapted; for instance, covering arbors or trellises, drooping over fences, training around pillars, spreading over tree roots, rocks or bushes, or over sandy or gravelly banks. Although the vines are ten to fifteen or more feet long they are moderately short-jointed, and spur-like laterals occur all along their length. These spurs are very short-jointed, hence, very leafy and floriferous, and after the flowers comes an enormous crop of bright, scarlet, oval-oblong fruit that hangs upon the vines from late summer until into winter, and which constitutes the ornamental beauty of the plants. The flowers are bright purple, rather larger than those of the common Matrimony vine, attractive on account of their multitude, and produced in great quantity from early summer until fall, flowers and ripe fruit



THE CHINESE MATRIMONY VINE.

occurring simultaneously in the autumn. The foliage is dark green, ovate-acute, abundant for a vine of this kind, but not bulky, and the vines generally terminate in long, dense, leafy racemes fairly loaded with scarlet berries. Ornamental berried plants are quite a feature in modern gardening, especially for autumn and early winter effects, and this Chinese Matrimony vine is a happy auxiliary to the group. But its berries have an ill-repute and should not be tasted. [The general character of the vine, as well as its flowers and berries is shown in our engraving.]

A NEW LATE STRAWBERRY.—E. P. ROE.

While our lists of good early and mid-season ripening strawberries are filled to overflowing, the number of first-class late-ripening varieties is but very small; yet it cannot be denied that considerable progress has been made in this direction, and new and more promising kinds are brought to notice from year to year. Prominent among the recently introduced late varieties is the E. P. Roe strawberry. This is a chance seedling found in the garden of an amateur horticulturist at Newburgh, N. Y. Its good qualities, and especially its late ripening, induced the owner to propagate the plants, and set out a small bed of them. When this came into bearing it attracted the attention of the introducer and other experienced, practical fruit-growers, who at once became convinced of its great value as a late berry for market as well as for home use. Our engraving—reduced to two-thirds of the actual size—gives a good idea of a fair cluster of these berries. The berry is of good size, attractive appearance, and very pleasant, sub-acid flavor. The foliage is strong, and hardy under the summer's heat, and the entire plant is vigorous, but the principal point in its favor is its late ripening. In the locality of its origin it is at its best about June 29th, and continues to produce a good crop up to July 11th.

THE EARLY CARE OF CHRYSANTHEMUMS.

E. E. REXFORD, WISCONSIN.

Very much of the success we desire in growing Chrysanthemums depends upon the attention the plant receives during the early stage of its existence. If neglected then, as most plants are by the amateur, it falls into a habit, if I may be allowed to use the term, from which it is never likely to fully recover. What should be aimed at is a good start. Large pots are not necessary at first, nor advisable, but a rich soil is. The plant is a great eater, and requires rich food, without which it becomes starved and dwarfed. A strong, healthy growth should be secured as a foundation for future usefulness.

While the plant is quite young, one must determine on the form to train it in, and begin operations promptly. If a shrub is wanted, pinch off the top, and branches will start below. These, when developed, will give the bushy form which many prefer for this plant. If preferred to grow it as a tree, allow no branches to grow along the stem of the plant, until it has reached the height where the head would form. This will generally be from two to three feet from the pot. When this height is attained, nip off the end of the stalk. Branches will soon start all along the stalk, in most cases, but only three or four at the top should be allowed to grow. When these have made a growth of five or six inches, nip off the ends of them, and this will cause branches to start along them, and in this way is secured the foundation for a bushy, compact head.

The young plants will generally be in three, four, or five inch pots, during the first two or three months of their independent existence. They should be watched and, as soon as the soil is filled with roots, shifted to pots of larger size. This is very important. If neglected after the soil is full of roots the finer ones about the side will be pretty sure to turn brown and decay, and this gives rise to a diseased condition which materially affects the future development of the plant. Three or four shifts are necessary during the season, if well-grown plants are desired. They ought to be given at least ten-inch pots to bloom in, and twelve-inch ones are better.

All through the season great care must be taken to see that the plants never suffer from lack of water. This is one of the most important points in Chrysanthemum culture. One neglect of this nature will give a plant a check from which it will hardly ever recover. Liquid manure or some other kind of fertilizer should be given at least once a week during the season, and twice a week after buds begin to show. The plant has enormous digestive powers, and can take care of large amounts of food. Too much can hardly be given. The principal points for the amateur to bear in mind, then, are: 1st. A rich soil. 2d. Plenty of water. 3d. Plenty of root-room.

EVER-BLOOMING ROSES.

Every lover of flowers likes to have something dainty and choice to give a friend, now and then, to place among his or her floral treasures. Such persons ought, by all means, to have a bed of ever-blooming roses, in which general title are included the Tea, Bourbon, Noisette, and Chinese sections of this most popular of all flowers. For richness of color, delicacy of form, fragrance, and general beauty, nothing exceeds a fine rose. The list of desirable roses for summer blooming is so extensive that it would be impossible to name them all in the limits of this article, but a few of the best are: Meteor, dark scarlet; Sunset, apricot and fawn; *Perle des Jardins*, clear yellow; Niphetos, white—used almost wholly for its buds; Hermosa, pink; *La France*, silvery rose, and Cornelia Cook, cream-white. These will give fine colors, and perfect flowers and buds, with the perfection of fragrance, and they are all free and constant bloomers if given proper culture.

In order to secure flowers in quantity throughout the season, the soil must be made very rich, to begin with. Spade up well, and work in a liberal quantity of old, thoroughly rotted cow manure. Spade up your bed about May 1st, but do not plant your roses before the middle of the month. Nothing is gained at the North by very early planting. Set the plants about a foot and a half apart. Take particular care to make the soil firm about the roots when the plants are put out. Many fail with roses because they plant them loosely. Cut the plants back to within six inches, or less, of the roots, if you happen to get large plants. Most of those sent out will be less than six inches high, and will need no cutting back.

Growth will soon begin. Each new shoot will be likely to bear flowers. As soon as these have developed, and faded, cut back the shoot bearing them to within a few inches of the roots, or main branch. If the soil is rich new growth will be encouraged promptly, and as the plants, by this time, will have become pretty well established, several new shoots will be likely to start. These will bear flowers, and should be cut back, like the first one, after blooming. In having a rich soil, which encourages constant growth, and in persistent cutting back, lies the secret of success in growing ever-blooming roses. By giving them proper care and attention, flowers can be had until the coming of cold weather. If you have a bed of these beautiful flowers this season, you will never willingly be without them again. For cutting for table use, for the button-hole, and the corsage, they are more desirable than any other flowers. They are grown in such enormous quantities by dealers that a good collection can be had for a small amount of money.

A NEW INDUSTRY FOR FARMERS' BOYS.

W. T. HUTCHINS, CONNECTICUT.

A friend of mine, who has a collection of walking-sticks, takes great delight in asking visitors to guess what a certain cane in the collection is made of. It has a beautiful knotty head, tapers just right, is remarkably light and strong, and has the alternate joints of a fine rustic cane. It is common pigweed; not the Amaranth pigweed, but the *Chenopodium album*, which grows from two to seven feet high on cultivated ground or waste places. As a mere rank weed, in rich ground it would not be likely to have either a good, knotty head or strength. But, to show what can be done with it, I found one, this summer, growing in a pile of rubbish just outside a blacksmith shop, where the ground was full of potash, and it is such a woody stick that, three feet from the butt, the shell is nearly a quarter of an inch thick, and cuts like any hard, dry wood, and the first half of it must be well-nigh solid. The head is a beautiful curled knot. With the bark left on, it is green and brown, shaded, to which varnish will add much, or, scraped off, it comes out as white as holly. My friend found his near an old factory. Now, pulled up from a cultivated field, it dries into a brittle and pithy stalk, but I think there can be no question that, on a patch of ground with plenty of potash, and well mixed with coal ashes and any old rubbish, with the surface just resisting enough to head the growing weed, and some pains taken to keep them straight, any boy can grow canes by the dozen that would outsell the ordinary twenty-five cent walking sticks. I ask every farmer to guess on mine, and not one can get it right.

GOOD USE FOR COLD FRAMES IN SUMMER.

F. H. FELTER, OHIO.

Cold frames can be used in summer to good advantage for starting cuttings of roses and shrubs. Hybrid perpetual roses start readily, if planted in cold frames, about the third week in May, in this locality. Last year, after putting several buckets of sand in a frame, I planted a large number of rose cuttings, as well as Deutzias and a few other shrubs, in this manner. The glass was heavily whitewashed to keep out the sun. Almost every cutting made strong roots in three weeks. I transplanted fifty of the roses in another frame, 3x6 feet, using whitewashed sashes again and gradually accustoming the plants to direct light and sun. By August 15th the roses were too high to allow the glass to be put on any longer, and on the 15th of November, when many of the plants had already bloomed, I potted most of them. Several hybrid perpetuals were planted out in the open ground, giving winter protection. Each of these hybrid perpetuals had sent up one to two shoots apiece, from two and one-half to three feet in height, and had woody roots averaging eighteen inches in length. Cuttings of the same varieties made in June, planted and cared for in exactly the same manner, resulted in total failure.

A FEW FACTS.

Hair on the legs of the milk-stool is a bad sign.

Wheat is not a fast-wearing crop when the straw is returned to the land *via* good farm animals.

Corn is a heat-producing food; therefore substitute oats as much as possible for the working stock during hot weather.

Corn fodder, put in shocks and left in the field during a good part of the fall and winter, loses from one-third to one-half of its feeding value.

THE SOUTH CAROLINA PHOSPHATE INDUSTRY.

W. K. MORRISON, SOUTH CAROLINA.

The phosphate rock of South Carolina is a great source of wealth to the section in which it is situated. The territory embraced by this deposit covers an area, seventy miles long by thirty in width, the amount and value of which furnishes a fruitful source of speculation for a number of explorers. The many rivers intersecting this region, their beds being composed of this rock, have made the industry easy of development, as large "tramp" steamers come right up to the works to be loaded for the various ports of Europe. The business is divided into two separate departments, land mining and river dredging, the aggregate product of each being nearly the same. Water mining, if I may use the term, is the cheaper method, but the State here imposes a royalty of one dollar per ton, as of course the State owns the rivers. The component parts of phosphate rock, are from fifty-five to sixty-one per cent., bone phosphate of lime, five to eleven per cent. carbonate of lime, from one-half to two per cent. sulphuric acid, and thirty-five to forty-two per cent. of lime and other elements. Fossils so abound here that Prof. Agassiz styled it "the greatest cemetery in the world," and Prof. Holmes, named it "the great Ashley Fish Basin." These deposits consist of nodules of phosphate of lime interspersed with the immense bones and teeth of stupendous terrestrial and marine animals of former ages. The work of phosphate mining is continued throughout the entire year and is generally conducted with great enterprise and skill, no labor-saving device being neglected, and with duplicate machinery constantly on hand. A large capital is necessary to conduct such operations, and small firms have never succeeded. The rock is "sounded for" by means of a long steel rod and is found from one to ten feet below the surface, the stratum being from three to thirty inches thick. Unless the deposits exceed six inches in thickness it will not pay to work them. A platform is built in the center of the field to be worked, on which the rock is piled. Then a railway is run through the center of the field. The miners begin at the sides of this field and work toward the center. A succession of pits is dug—six by twelve feet—along the whole line of the field. The soil from the pits is thrown to the rear, and the rock at the front is then rolled to the center of the field where it is piled on the platform. The soil from the next pit is thrown into the pit previously excavated, and in this manner the whole field is worked over. In some of the fields the men are greatly worried by large timber, and, during rains, by water collecting in the pits.

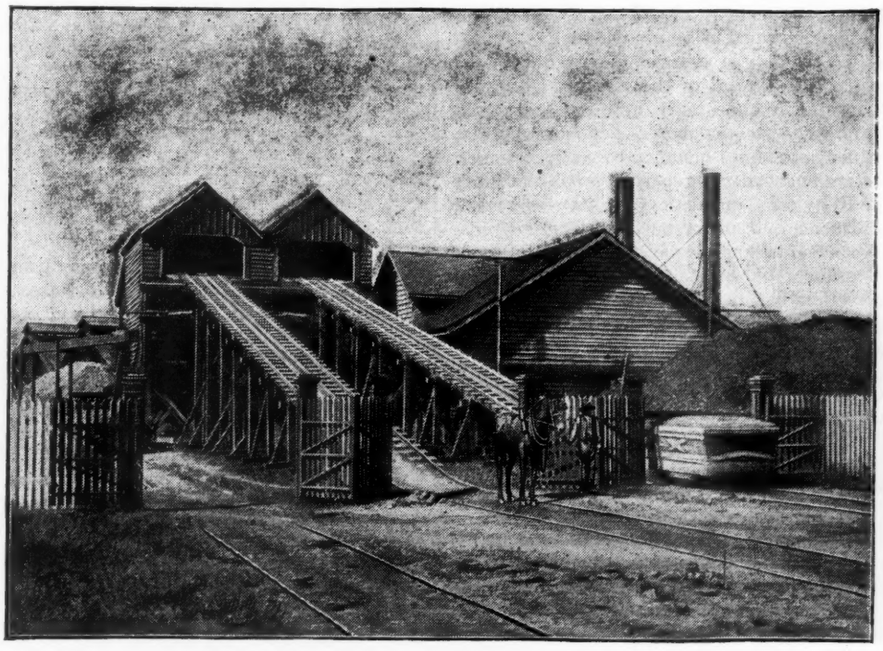


Fig. 1. PHOSPHATE WORKS NEAR CHARLESTON, S. C.

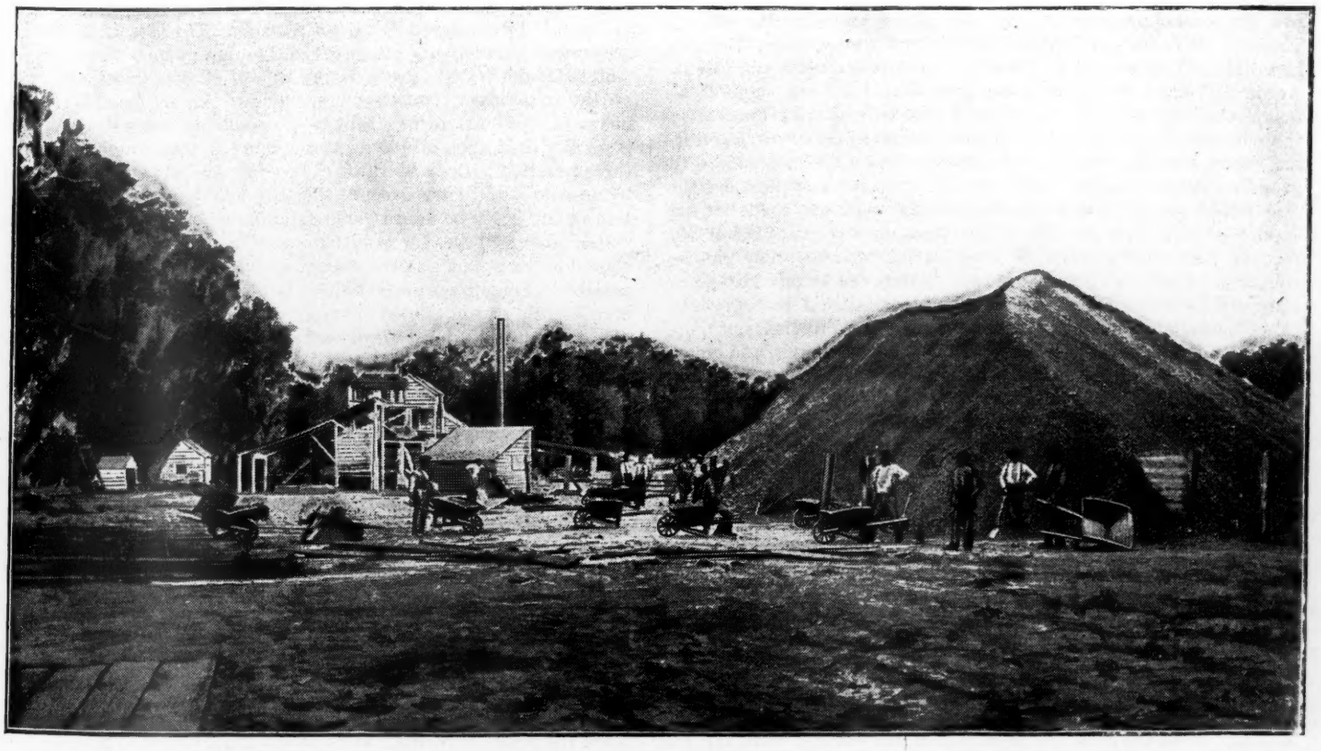


Fig. 2. CARTING PHOSPHATE ROCK TO THE WORKS.

The rock, together with the clay in which it is imbedded, is taken to the works in dump-cars to be washed. Here it is emptied into powerful breakers, armed with large teeth, and is crushed to pieces of uniform size. It falls from the breakers into troughs

resting on an incline. In each of these troughs is an octagonal shaft, cased in iron, and set with blades or flukes, revolving and giving a sort of spiral motion which churns the rock around and forces it out upon screens. While the rock is undergoing the above process, a powerful stream of water is injected into the tubs, cleansing it of all foreign matter. By means of screens of various meshes the gravel is also removed. The rock is now ready for shipment, and is piled on platforms to await orders. Much of it is now kiln-dried before shipment, wood being used as fuel.

Formerly, negroes were the only laborers employed, but for the past few years, Sambo has had a rival in the Italians, who work here in the winter season. Their appearance here has had a salutary effect on the negro. The rough laborers get from $5.00 to $6.00 per week, but skilled mechanics command excellent wages. Some of the companies are engaged in preparing fertilizers ready for the farmer's use, and buy large quantities of cotton-seed meal, blood, fish scrap, ground bone, muriate of potash, nitrate of soda, sulphate of ammonia, Nova Scotia land plaster, kainit, etc. Recent discoveries of large deposits of phosphate in Florida have had a slight influence on this section, but the result can hardly fail to be favorable to Carolina, as it would be hard to find a more favorable location, embracing as it does splendid transportation facilities.

[One of the principal phosphate works on the Ashley River is seen in Fig. 1, and in Fig. 2 is presented a view of the phosphate lands and the mode of the carting of the raw material to the washing works.]

PEAS AS SHEEP FOOD.

There is no better sheep food than peas, and as about as many peas can be grown on an acre, if mixed—so as to be half oats—as when grown alone, and as the oats will, in ordinary years, hold the peas up so they can be cut with a mower, it is better to mix them in the proportion of two bushels of the small Canada field pea to one bushel of oats, choosing a kind of oats with pretty stiff straw. The best way to prepare the ground and sow the peas is to use good land. Corn stubble, if one has it, is best, but if sod ground is used have it fall-plowed, or plowed as early in spring as possible, and, as soon as it is in good working order, harrow lightly and sow two bushels of peas per acre; immediately plow from four to six inches, so as to cover the peas at least four inches deep. Wait a week and sow one bushel per acre of oats, and give a thorough harrowing. This will leave the peas deep in the soil, and the oats near the surface, just as they should be; it will not injure the peas, will kill all weeds that have started and will give each an even send-off to insure the largest yield. It is a good plan to roll the ground after the oats are harrowed, as it will leave it smoother for the harvesting. Soon after the peas get beyond the eating stage, and while still green enough so that the pods will dry down holding peas, cut the crop with a mower, and, when cured, so they will not mold, but not enough so as to lose the leaves, put them into cocks of 200 or 300 pounds, and after a week of good curing weather they can be simply aired out and put into mows; or they can be put into good-sized stacks without cocking, but the stacks should be topped, or capped, with any cheap hay or swamp grass, put on when not more than half cured; otherwise, they will wet half through, and much will be spoiled. This crop may be threshed with a machine, but for sheep feeding it will be better to feed without, as the sheep will eat everything clean; and the farmer can feed according to his judgment, and the haulm will not be broken.

REMEDY AGAINST MICE IN THE CORN FIELDS.

J. T. SEYMOUR, LONG ISLAND, NEW YORK.

Many farmers on Long Island find it difficult to get a good stand of hill corn, owing to the prevalence of large field mice, which run through the hills and eat the seed before it comes up. One farmer in this section has found the old custom of coating the corn with pine tar an effectual remedy. To apply the tar, pour boiling water on the corn, letting it remain but a moment, then pour off and mix in the tar. A teaspoonful will be sufficient for about four quarts. After the corn has been thoroughly covered with tar, roll it in wood ashes, or land plaster, and it is ready for use. Care should be taken in applying the tar that too thick a coating be not put on, as it might prevent germination. An old iron kettle has been found useful to stir the corn in while applying the tar. This same remedy will prevent crows, blackbirds, etc., from pulling the corn after it has sprouted.

THE THEORY AND PRACTICE OF SPRAYING.

E. G. LODEMAN, CORNELL EXPERIMENT STATION.

Insects and fungi are the principal agents which reduce the value of crops, but since the grower has, at his command, means of destroying these pests, he has, as a rule, no one but himself to blame if he is much troubled by them. By spraying plants with suitable materials, a good crop can almost be guaranteed, provided that the conditions for the healthy development of the plant are present. Spraying in itself will not produce good crops, but it will prevent injurious agencies from affecting the crop which would naturally be produced. It is an operation which is designed to protect plants, not to make them grow more vigorously or to bear more profusely, although these results are, nevertheless, indirectly obtained. An injured plant will not do so well as a sound one; a vine covered with mildew cannot be so vigorous as one not so affected. Countless instances could be brought forward to show how plants have lost all their foliage through the action of insects. But whether the foliage is ruined by insects or by fungi, the effect upon the plant is the same, a checked growth and a loss of vigor. When the fruit is injured, the plant does not suffer so much; it is then the turn of the pocket-book. Millions of dollars are annually lost to the farmers of this country on account of the injury done by fungi and insects. Almost every cultivated plant has its enemies, but almost every one of these can be overcome by persevering and intelligent application of remedies within easy reach.

The substances used in spraying may, in general, be divided into two classes, insecticides and fungicides, the former being used against insects, the latter against fungi. Insecticides may further be divided into two classes, according to their mode of action; those which act after entering the body of the insect, with its food, and those which kill by coming into contact with the external surfaces of the insect's body.

Insecticides.—This division of insecticides is an important one. Take for instance the potato beetle. This insect is a voracious feeder, and by placing some poisonous substance upon the foliage which is eaten by it, the poison enters the body with the food, and the beetle soon stops work. Currant worms, tent caterpillars, curculio, in fact all insects which feed upon the external tissues of plants may, with but one or two exceptions, be destroyed in this way. It is the easiest and cheapest method, and should be employed so far as possible. The insecticides which are commonly used are Paris green, London purple, white arsenic and hellebore. Paris green is the safest, but the most expensive of the arsenites. Its arsenic is mostly in an insoluble form, hence it does not injure foliage so much as the others. It is generally used upon all plants at the rate of one pound in two or three hundred gallons of water. Peaches are very easily injured by arsenites, and Paris green is the only safe one to apply, but even this should never be used stronger than one pound to 300 gallons of water, and still weaker solutions give good results. The spray should be very fine, and the foliage should be covered as evenly as possible. London purple contains a large amount of soluble arsenic, and for this reason should never be applied to peach trees. I have also seen plums seriously injured by its use. It is generally applied at the same rate as Paris green, but the foliage is more apt to be scorched. The soluble arsenic may be rendered insoluble by adding a gallon of the milk of lime to every fifteen gallons of the London purple solution. When thus prepared, London purple may be used with perhaps as much safety as Paris green.

White arsenic is a dangerous substance as it is so readily mistaken for other white powders. When used alone, it is caustic to foliage, but the following treatment, recommended by the North Carolina Experiment Station is said to make its use perfectly safe: Boil one pound of commercial white arsenic and two pounds of unslacked lime in two to five gallons of water for about half an hour. Dilute one or two hundred gallons of water before using. Hellebore is a vegetable product, and should be used upon plants which require spraying very shortly before the fruit comes to maturity.

Insecticides which kill by contact, are used against insects that suck the juices of plants. It is of no avail to try to destroy these pests by placing upon the surface of attacked plants those poisons which are effective only when eaten, as the beak of the insect passes through the external tissues of the plant before any food is taken. These insecticides, as a rule, are more difficult to prepare and apply than are those of the first class, but their use is often a necessity. Sucking insects generally have soft and tender bodies,

readily penetrated by poisonous substances, such as lye, kerosene, etc., which are fatal to the insect. In spraying these insecticides upon the plants, the aim should be to strike the insect, and not to cover the foliage with a coat of poison. If the insect escapes untouched, it will continue in its work as before. It is often hard to reach the enemy on account of the foliage, bark, or other protective substances; but the excellent insecticides which we now have at our command, in most cases insure the destruction of the pest, especially if a good nozzle and pump are used in making the application. However, before any insecticides are prepared, it is necessary to determine in what manner the insects, whose destruction is desired, obtain their food. I once saw a man applying London purple to his pear trees to destroy a sucking insect. Time, money, patience and faith are all thrown away in such an operation.

Kerosene emulsion is the best insecticide of this class. There are several formulas according to which it may be prepared. The following will give satisfaction: Soft soap, one quart; kerosene, one pint; hot water, two quarts. Churn the materials by pumping back into the pail until well mixed. This should be diluted two or three times before being used.

Fungicides.—In fungi we find a very different class of enemies. A fungus is a plant, but, unlike flowering plants, it possesses no chlorophyl, through which plants change crude food to nutritive material, but feeds upon organic matter which is already adapted to their wants.

The life histories of the various fungi must form the basis of any methods of treatment which may be followed. At certain stages of their existence most parasitic fungi may be checked quite easily, and at such times they should be attacked. When a fungus has once become established in a plant it cannot be reached without destroying the tissue of the host in the affected places. The parasite must be destroyed before it enters the host; this is the principle underlying the application of most fungicides. The applications should be preventive, not curative, for a cure is practically impossible when the fungus is once established. Some fungi, such as the

FIG. 1. ANGERS QUINCE DEFOLIATED BY LEAF BLIGHT.

powdery mildew of the grape, grow principally upon the outer surfaces of the host plant, and do not penetrate the inner tissues to any great extent. As a rule they are not serious, for they may be destroyed by dusting the plants with flowers of sulphur. The most injurious fungi are those which grow mainly within the host plant, and the line of treatment indicated for them is to cover the stems and foliage of the cultivated plant with some substance that will destroy the spores as soon as they germinate, or even before. This will dispose of the enemy at an early stage of its existence.

Substances used as Fungicides.—Several substances which destroy spores in this manner have already been found; as a rule they are effective, easily applied, and safe. Principal among them are the copper compounds. These have almost without exception given the best results, the sulphate of copper, and the carbonate of copper having proved to be particularly valuable. They are prepared in various ways, of which the following are probably the most important:

Sulphate of copper may be used by dissolving one pound in about twenty gallons of water, but when thus prepared it should never be used upon foliage, for the solution is stronger than the

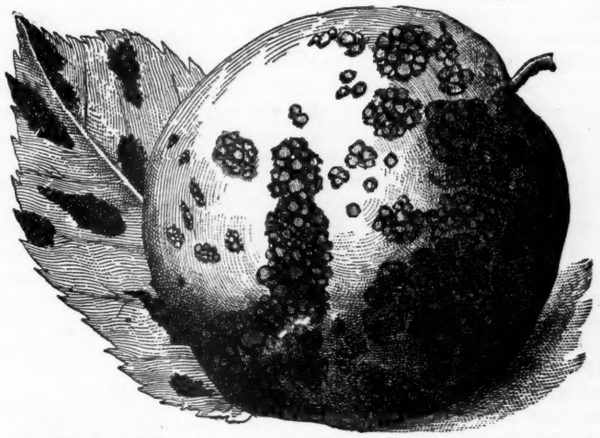


FIG. 2. FRUIT AND LEAF AFFECTED WITH APPLE SCAB.

leaves will bear. But it is an excellent fungicide to apply to trees and vines before these have started in the spring. These early applications destroy any spores that may be present upon the various parts of the plant, and tend to reduce the severity of later attacks of the fungi.

The Bordeaux mixture is, probably, the most valuable fungicide which we now possess, so far as its efficiency is concerned, but it is rather hard to apply. It is made by dissolving six pounds of copper sulphate in one gallon of hot water, using a wooden vessel. Slake four pounds of quicklime in sixteen gallons of water, and to this add the copper solution. Dilute to twenty-five gallons before using. Prof. Weed claims to have obtained apparently as good results by diluting to fifty gallons. The coarser particles of lime should be strained out before the mixture is used.

Carbonate of copper is used to the best advantage when it is prepared according to the following formula: Dissolve three ounces of the carbonate in three to five pints of ammonia, the stronger the ammonia the less is required. Dilute with water to twenty-five gallons before using. This fungicide is almost, if not quite, as effective as the Bordeaux mixture. It has, besides, the advantage of being more easily made and applied. Upon plants which require several applications, it is the custom to make one or two with the Bordeaux mixture early in the season, using the ammoniacal carbonate of copper for the later ones. The Bordeaux mixture should not be applied to fruits shortly before they ripen, for the crop is thereby stained, and its commercial value lessened. Enough poison to affect the culinary value of the fruit cannot very well be deposited, even upon the grape.

If fungicides and insecticides could be applied at the same time, much labor would be saved. But experiments have not been carried on long enough to warrant an unconditional recommendation of any of the combinations thus far tried. The Bordeaux mixture and the arsenites may be applied together with safety, and good results are reported from its use. At the Cornell station, experiments were carried on to test the value of a combination of the ammoniacal copper carbonate and arsenites. Until further trials are made, this combination cannot be generally recommended. Craig, of Ottawa, Canada, has, however, obtained good results with it. Its action upon foliage is apt to be caustic. Fig. 1 represents an Angers quince tree, some of the lower branches of which had been sprayed with ammoniacal copper carbonate, one-half the strength recommended in the formula, and Paris green as ordinarily used. The leaves of the sprayed branches remained upon the tree until late in the fall, but those from the rest of the tree dropped during the latter part of summer. The Bordeaux combination is, however, the safer one to use, although the addition of about a pound of quicklime to a barrel of the ammoniacal copper carbonate and arsenite will tend to make it a safe combination.

Fruits Benefited by Spraying.—The fruits which are particularly benefited by spraying are apples, pears, quinces, plums, grapes.

and strawberries, while among vegetables the potato probably requires the most attention in this respect. Each of these is attacked by several enemies, but, as a rule, when applications are made to destroy the more important ones, the others are kept in check at the same time.

The most serious disease which attacks the apple is, undoubtedly, the scab (Fig. 2). It works upon the leaves and the fruit. Upon the latter it forms dark circular spots, the largest being about half an inch in diameter. These spots are often close together, and may unite and cover large surfaces upon the apple. When the diseased area is quite extensive the surface generally cracks open, and the hard brown tissue of the apple may be seen within. The disease attacks the leaves, generally upon the upper side, and causes brownish black spots to appear. The treatment of the apple scab should begin before the buds burst. Spray the trees thoroughly with the sulphate of copper. Then, when the fruit has set, they should be treated again, but this time with the Bordeaux mixture. The condition of the weather will influence the frequency of later applications. If it should be cold and damp, a third treatment should be made about ten days after the second, and, if the rains are very heavy, it would be better not to wait longer than six or eight days. The Bordeaux mixture should be used. The trees will, probably, require one more spraying, from ten to twenty days after the third one, and, unless the season is unusually wet, these are all that will be required. The ammoniacal carbonate of copper may be used in all the later applications. They should be made at intervals of two or three weeks, if needed. In order to prevent injury from the codlin moth, the trees should be sprayed with Paris green, or London purple, as soon as the blossoms have fallen, but not before. A second application should be made in about ten days, but if the weather is rainy the poison should be applied as soon after each heavy shower as possible. There should be poison in the blossom end of the apple when the egg laid by the moth hatches; heavy rains wash it out. It will be seen that the applications for the codlin moth are made about the same time as some of those for the apple scab, and at such times a good combination of insecticide and fungicide would save much work. Those which we already have are well worth trying. Apple trees which are treated in the above manner will have good, healthy foliage, and will themselves be more vigorous. They will be practically free from all fungus attacks and from all insects. The fruit will be larger and better, and there will be more of it. Pears and quinces are also benefited by the same treatment, although the scab is not usually so serious upon them.

FIG. 3. LEAF AFFECTED WITH FUNGUS POTATO-ROT.

Plums are attacked by various fungi, but the treatment recommended for the apple scab will keep most of them in check. Leaf blight and brown rot will be greatly reduced. But plums have a more serious enemy in the curculio; and this insect attacks peaches, nectarines, apricots, and cherries as well. Cherries, however, should never be sprayed with arsenical poisons, as the fruit ripens too early in the season. Plums should be sprayed with Paris green, or London purple, as soon as the blossoms have fallen. Three or four applications should be made at intervals of eight to fifteen days, depending upon the state of the weather. The insects and fungi may also be treated together, as in the case of the apple, and an abundant harvest should be the result. It has been claimed that the plum curculio does not eat, because it has a snout. But it does eat, and it can be kept in check by spraying the trees with arsenites. It has been done again and again.

Grapes are not much troubled by insects, but among the fungi they have more than their share of enemies. Several of these diseases are serious, but, fortunately, they all yield to proper treatment. The most serious ones are the black rot, downy mildew, anthracnose, and the bitter rot, but there are others which, in certain seasons, are quite destructive. Black rot is the worst one, and to keep it well in check the vines should be sprayed or washed with the copper carbonate solution before the buds burst. This is not strictly necessary, but the number of spores is, no doubt, considerably decreased. As soon as the first leaves have expanded, spray with the Bordeaux mixture. Spray again when the vines are in full blossom, and again at intervals of two to four weeks, until the fruit begins to color. The ammoniacal copper carbonate should be used in all applications made after the first of July, otherwise the fruit will be stained. This treatment will also keep the other fungus diseases in check.

Potato Pests.—Potato growers have to contend against the potato beetle and two or three kinds of rot. The former is easily disposed of by spraying occasionally with arsenites, but the rot is hard to deal with. There are two kinds of rot to which most of the damage done may be attributed, one being caused by a fungus, the other by a bacterium. The fungus generally attacks the leaves first, but sometimes the stems. The diseased portions are first yellow, later brown, and, finally, they become quite black. They rapidly increase in size, and quite large areas have a uniform coloring. The healthy tissue is separated from the diseased portion by a rather sharply-defined dividing line. The tubers are generally attacked by the spores, which ripen upon the leaves, and afterward are washed into the soil. Spraying for this disease is followed by beneficial results. An affected leaf reduced to one-half actual size is seen in Fig. 3. The bacterial rot is not well understood, but we know that it often does a good deal of damage. It differs from the fungus rot in that the diseased portions are not so clearly defined. The entire plant seems to be affected. The leaves have a faintly-yellow, blotched appearance; they curl and seem to become smaller. Later, some of the tissue in the yellow portions dies, causing dark gray spots scarcely an eighth of an inch in diameter. The entire leaf soon dies, and the stems and tubers also decay. No remedy has yet been offered for this disease, but spraying will probably do no good. In France, where the fungus rot of the potato is quite severe, estimates have been made showing the results of spraying for this disease. After uniting the results obtained by forty-one growers, seventy-one experiments having been made, it was found that the average yield per acre on the sprayed fields was 73.7 bushels more than on those not so treated. The treatment, of course, should be preventive. The disease generally appears during the latter part of July, but the application should be made before that time. The Bordeaux mixture is probably the best fungicide to use. It should be applied at intervals of two to four weeks, and three applications should keep the fungus in check. Combinations of insecticides and fungicides can be used to advantage.

Spraying Machines.—The requisites for applying liquids to plants are a good force pump and a suitable nozzle. Among the best machines for spraying grapes, potatoes and all the smaller plants, are the knapsack pumps. When fitted with a Vermorel nozzle, they throw a fine, steady spray. For orchards, larger machines are necessary; those which run by gearing give good satisfaction, but they are quite expensive. In the case of tall trees in parks, such as elms, which frequently attain to great heights, the use of fire engines has been recommended by means of which the liquid can be thrown to a considerable distance, the force of the discharge causing the stream to break up into an efficient spray. A machine should throw a steady stream with force; it should be durable, easily worked and repaired. The spray should be as fine as possible, and still reach to the desired height; but, even though the best machinery is not at hand, spray anyway. I have heard of a man who had nothing but a watering-pot and a step-ladder with which to spray his plum trees. He started out bravely, but became tired out before he got through. The following summer every sprayed tree was loaded with fruit, while those trees he did not reach had none. Although this may be a slight exaggeration, still it is founded upon fact, and serves well to illustrate the value of protecting our crops.

FLOWERS FOR CUTTING.

Every woman who loves flowers would like to have so many of them growing in her garden that she may feel free to cut from them as occasion demands. If only the beds "in the front yard" are available she often hesitates to cut lest she injure the display, of which she is justly proud. It is, therefore, advisable to have a collection in the back yard, or some convenient nook or corner, especially for cutting from.

What kinds are best for this purpose? That depends largely upon individual taste and what one likes best. If we were to make a selection for cutting purposes, we would have sweet peas, nasturtiums, asters, pansies, sweet alyssum, mignonette, stock, salvia, gladiolus, and heliotrope. This list gives beautiful flowers, brilliant ones, and fragrant ones. The sweet peas and nasturtiums are excellent for use in tall vases. They are most effective when used alone, as, indeed, are most flowers. Pansies should be used in low, flat dishes, with a fringe of simple foliage about the edge. Rose-geranium leaves are useful in this connection, as are ferns, or even grass. Salvia is excellent for use in large, tall vases, and should be cut with long stems, bearing plenty of foliage. Gladioluses are also adapted for similar use. This flower is extremely valuable for cutting, because it has such lasting qualities. Buds develop and bloom in water as though the stalk were still connected with the bulbs. A cluster of heliotropes and rose-geranium leaves makes a lovely little bouquet for the desk or the sewing table. A spike or two of mignonette is generally sufficient to accompany quite a quantity of other flowers, because it is so richly odorous that "a little goes a good ways." Hollyhocks are among the best of all plants for use in very large vases. Another grand flower for such use is the new *Helianthus multiflorus plena*. Its rich, yellow blooms make sunshine in the shadiest corner. This flower combines very well with *Salvia splendens*, the intense scarlet of the latter contrasting vividly with the yellow of the other, and harmonizing perfectly. With these two, it is easy to create a "symphony in red and yellow" that will catch and delight the eye of an artist. Most of the flowers named bloom all the better for frequent cutting. A few plants will furnish a supply throughout the season, if properly cultivated, and the care required by them when grown for this purpose is not greater than that given to the commonest vegetables. The vegetable garden is an excellent place for growing a few rows of flowering plants, and will be all the more attractive for their presence. The good influences of flowers ought not to be confined to the garden, and we are glad to encourage the liberal use of them in the house.

ARUM DRACUNCULUS.

ARUMS.

As a rule, plants are grown either for their flowers or the fruits they bear, but the principal beauty of the Arum is in the leaf, or the several leaves, which with the stem constitute the whole plant. The flower, which appears and dies away before the stem commences to grow, is indeed curious, but less pleasing in appearance and fragrance. But the plant itself is one of the most interesting objects the sub-tropical garden affords in summer. *A. dracunculus*, illustrated herewith, one of the most common species in cultivation, has a beautifully spotted stem, with large, pedate leaves, which form an umbrella-shaped head that is an object of beauty the entire summer.

Amorphophallus Rivieri, a closely-allied species, is a still more remarkable plant of the same general character; it is larger in every respect, and the stem more beautifully mottled. Its purple spadix or flower is the reverse of beautiful, and so fetid that with many persons it would produce headache. The tubers of all the Arums should be kept dry and warm during winter, and planted out in spring, in the same manner as the gladiolus. The Indian turnip or Jack-in-the-pulpit, belongs to this family, and when well cultivated is a beautiful plant. Our woods furnish several varieties of this, all of which are vastly improved by garden culture. They delight in the shade that will not do for most flowering plants. The flowers are succeeded by bunches of scarlet fruit that remain on the entire summer. These are perfectly hardy and need but little attention after planting.

THE NORTHERN GROWTH OF COWPEAS.

J. G. PORTER, OHIO.

Growing cowpeas should not be restricted to the South, for a single trial of them in the Northern Lake region presents the possibility of utilizing this plant over a much more extended area than is now supposed to be practicable. Its chief value in the North, where corn and clover grow luxuriantly, would not be as a forage plant, but as a green manure. Allied to the clover plant in belonging to the legumes, possessed of rapid growth, large foliage, deep-rooting habits, and, so far as habits are concerned, growing well on fairly fertile soil, as soon as the ground becomes warm enough for a millet crop it is safe to sow in the corn belt. In eighty-five days from sowing, the crop is ready to turn under, and, if chemical analysis is considered, it ranks with clover, so that, as a fertilizer, cowpeas return nearly as much benefit as clover, and that within twelve weeks. With clover one must wait eighteen months, or two years, before it can be turned under at a profit, and it has two seasons of peril during this time, from winter killing. Here, in contrast, is a crop that can be grown and turned under the same season. A little experience of mine, two hundred and seventy-five miles north of the Ohio river, may be of interest. I have a field, the soil of which is yellow clay, of unknown depth, but, treat that field as I would, I failed signally in getting a paying crop, and absolutely so in a clover catch. Two years ago I plowed the field, harrowed it thoroughly, and sowed on a bushel per acre of cowpeas. I should have put on two bushels. The peas came up finely, but just in time to be struck with a five-weeks' severe drouth. Then came the rains, and the peas made rapid growth, covered the ground, and grew to be nearly, or quite, two feet high. Then they were turned under, using a jointer on the plow, as well as a loop chain. The clay had settled down pretty compactly, and, in plowing, many of the roots were pulled up out of the subsoil, and they certainly had gone down at least two feet all over the field. As I did not want the field to "wash" during the usual rainy winter, a bushel of rye was sown on and harrowed into the turned soil. Last spring a light coating of manure was scattered over the field and the plow put in. To my great surprise the field turned up in the most perfect manner, and so mellow that it was difficult to comprehend that it was the same soil. The field was worked and planted to Virginia white corn, for silage, and it made a most gratifying growth. The mellow character of the soil continued through the season, making the work of cultivation easy, which was mostly accomplished with a good horse weeder, and finer corn I never put in the silo than came from this heretofore poor field. I am sure that the cowpea can be made of great value in the North, and I shall treat another field the coming season with peas.

Two Weddings.

MADELINE GILBERT.

Dinner at the Hollister's had been over for half an hour. The head of the house had gone to his work, and the younger children to school. But still the table with its dingy red cloth and array of unwashed dishes stood untouched in the shabby little dining-room, while Mrs. Hollister and her daughter Margie sat over their coffee in earnest conversation. Mrs. Hollister's furrowed face, misshapen hands, and dark calico wrapper formed a singular contrast to the smooth, peach-blossom skin, soft white fingers and delicate blue cashmere morning gown of Miss Margie. The girl's eyes were red with weeping, and her voice harsh and petulant as, with an exclamation of contempt, she tossed a small roll of bank-notes on the table. Her mother looked tired and anxious as she said in a soothing tone:

"Come, Margie, try to be content. Father can't do any better by you just now. You know he said when he went out that he would be glad to give you the grandest wedding that ever was, if he could!"

Margie remembered the words, but not the awkwardly tender touch of the big toil-worn hand on her brown hair. Her mother's remarks only caused a fresh burst of tears.

"What's a hundred and fifty dollars!" she sobbed.

"I'd have thought it a fortune when *I* got married," replied her mother, "but that of course was twenty years ago," she hastened to add, as Margie's lip curled with a coming sarcasm. "It isn't every girl that has a hundred and fifty dollars to do just as she pleases with."

"But I please to do so many things," said Margie. "I must have a wedding if I never have anything more as long as I live! A real stylish church wedding like Mary Elton's, with flowers, and music and presents, and a white satin dress—so there!"

"But Mr. Elton is a rich man, dearie, and owns several houses, while your father hasn't quite paid off the mortgage—"

"Now, mother, please don't speak of that tiresome old incubus again. It has been held over my head ever since I can remember. Now, if Celia would only be reasonable and consent to a double wedding it would lessen the expense, and give us each a fine send-off. She has only a hundred and fifty dollars that she saved from teaching last year—the rest of her salary, as you know, went toward Rob's college bills."

"There she comes now across the garden!" exclaimed Mrs. Hollister, a gleam of hope lighting her faded eyes.

Somehow everybody always brightened a little at the sight of Celia Reed. She moved in an atmosphere of sunny helpfulness and peace. Practical, sensible, self-contained, cheerful, she was as wholesome and bracing as the north wind, as genuine as pure gold, as reliable as granite. She came to a side door that opened into the dining room, and knocked lightly.

"Come in!" called out Margie, still sitting with both elbows on the table. Celia entered, radiant with health and a good conscience, and set down a dish covered by a snowy napkin.

"I've had very fair luck with that new rule for buns," she said, "and want you to try them. But, what is the matter with Margie, Aunt Caroline? A bride-elect ought to look happy and hopeful. Come, little cousin," she continued, going to Margie and laying a hand on her shoulder, "has Mr. Norris 'deserted'?"

"Jo is all right, Celia; but Pa has just given me my allowance for a trousseau, and I am just wondering what he thinks I can do with one hundred and fifty dollars!"

"Why, Margie, you know that I will not have a penny more than that, and I am sure that it will do very nicely. Father has had such a hard winter and spring, and with doctor's bills and all, that I shall not ask him to help me."

"Now, sit down, Celia, dear, and listen to me," said Margie. "This wedding is the greatest event of my life, and I want a real showy affair, something to remember and talk about always. If you will join with me, we can manage it beautifully. There need be no reception you know, and we can put nearly all the money into the public ceremony."

"But I don't think as you do, Margie. Everybody that knows of us is aware that our families are in very moderate circumstances, and that we marry young men with their fortunes yet unmade. A wedding such as you suggest would make disagreeable comment. Besides, we could not afford to perfect all the little details, and a failure would be very ridiculous."

Margie looked sulky and determined, but Celia went on bravely, "Nelson and I have decided to be married very quietly in mother's parlor, with just our nearest relations present. There will be no cards, and we wish no presents. We will go right to the cottage on Cedar street, take dinner in our own home, and attend your wedding in the evening."

"What, no trip?" asked Margie.

"No trip," replied Celia, laughing. "Nelson cannot be away from the office but two or three days. Why should we rush to the city, and spend money in hotel bills and carriage hire, and do without the lovely great Turkish chair we will order instead from Dalton's?"

"Well, I must say that your plans strike me as very dull," declared Margie scornfully, as she twirled her Rhinestone engagement ring.

"I think Celia is in the right," said Mrs. Hollister.

"O, Celia is always right!" snapped Margie, "but even Celia can't do much with a hundred and fifty dollars."

"I shall have enough," said Celia cheerfully, rising to go, "though I really wish that we had summer and not fall to plan for. I have sent for samples already."

"O, I thought we could go together to the city for a day, and have a good time buying our outfits and taking lunch," pouted Margie.

"But a trip to the city would cost us each the price of two pairs of good gloves," laughed Celia again.

"You will get thin chasing a cent, Celia Reed."

"No, dearie, I am not miserly; but cents have a queer way of growing into dollars, and dollars well spent mean lots of comfort and satisfaction. Good-by, Auntie. Let me know if I can help you about those pickles. Good-by, Margie."

Celia had reached home before either Margie or her mother spoke again. Then Mrs. Hollister rose to clear off the table, and Margie said decidedly,

"Celia is welcome to her poky ideas. I say again that I will have a wedding if I never have anything more in my life."

"Well, dear," replied her mother with an involuntary sigh, "you know that I would give my last atom of strength, and my last penny for your happiness, but I fear you have undertaken too much."

"Shan't I help you with the dishes, Ma?" asked Margie, gathering her blue train on her arm.

"No, child, it would soil your gown."

"Well, since you do not need me, I'll go and finish that crocheted edging."

So Margie swept out of the room and upstairs to her own chamber, where she spent half an hour in arranging an ample white mosquito netting upon her head and shoulders, to see for the tenth time how becoming a bridal veil might be! Then she picked up a novel, and read on undisturbed by the clatter of pans and kettles in the little hot kitchen.

Several weeks later, Celia came over by special invitation to see Margie's trousseau. The girls had agreed to keep their preparations secret from each other until all were complete.

"It makes me angry to see you so calm, Celia Reed!" said Margie, grown pale and nervous with worry and vexation. "No one would think that you are to be married to-morrow. Why, I have forty thousand things to see to, and I know something will go wrong, and mother down with one of her bad headaches. I don't see why she should get sick just now."

Celia looked stern, but shut her lips tightly.

"There have thirty presents come already," rattled Margie, "but I ought to have at least a hundred and seventy-five, for we sent three hundred invitations. There isn't much silver, only a dozen silver-plated spoons, and two pickle casters, but the things are all better than nothing. The Thorpes haven't sent anything yet, but of course they will."

"Margie Hollister, did you send cards to the Landon Thorpes?"

"Why, yes," said Margie, bridling and flushing, "Pa does all the repairs on their house."

"But you don't know these people to bow to!" groaned Celia.

"Now, don't preach!" said Margie. "I'm going to have a real wedding. The church will be thrown open to everybody, for I want a crowd."

Celia's cheeks were flaming. This girl was her own cousin, and the folly and bad taste of the coming wedding were town-talk. She followed Margie to the spare-room to see the much talked-of outfit, and was quite prepared for the spectacle that met her eyes. On the bed lay a white satin gown of flimsy quality with a very long train, a tulle veil, long white gloves, a handkerchief of imitation lace, and a pair of satin slippers.

"Aren't they lovely?" exclaimed the owner of the trash, looking affectionately at the billowy display. "Of course, they're not the best to be had, but I shall probably never wear the gown again, and no one will inspect it closely. Here is my traveling costume," showing a light grey flannel, trimmed with coarse grey fur, and a turban and gloves to match. "Not at all what I wanted, but I could not do much with such a little bit of money. Then, here is a green surah. My! if it hasn't begun to drag out in the seams just from trying it on. With winter coming on, I knew I ought to have a coat, but my money gave out. Then mother said she guessed she could make over her old beaver once more, and gave me the money she had saved toward a new cloak for herself, and I bought this little wrap."

"Not much warmth in it," said Celia.

"No, but the jet is very dressy. There was enough in what Ma gave me to get something heavier, but I needed the difference for other things."

Then there was a pause.

"Well," said Celia.

"Well," replied Margie, with a toss of her head, and a slight blush, "that is all I care to show you. Some of my things are packed."

Celia turned and went down stairs, knowing in her heart that Margie had been obliged to fall back on her small stock of ordinary and well-worn muslins for her real necessities.

"By-the-way," said Margie, following her cousin, "I haven't heard anything from Uncle Frost, have you?"

"No; but it seemed the right thing not to leave him out in the cold. He is too odd to pay any attention to the letters."

"Do you suppose he is rich, Celia?"

"Rich? No, indeed! Whoever heard of a rich sexton!"

"But he has been at St. James's for years and years, and has never married."

That same afternoon, Margie stood astonished before the simple but complete outfit that Celia unfolded for her inspection.

"You need not tell me that you did all this for one hundred and fifty dollars!" declared Margie indignantly. "You had more than you let me know."

"Truly, Margie, these things did not cost as much as that." There was a good black silk, a street costume of dark cloth, an astrachan cape and muff, a pretty tea-gown, an elder-down Mother-Hubbard, cotton dresses for kitchen wear, a sufficient stock of flannels, hosiery, and dainty undergarments, handkerchiefs, two pairs of shoes, two of gloves, a couple of hats, an umbrella, and even a pocket-book.

"But you will have no wedding!" said Margie for her own personal solace.

"I shall be none the less married to the man I love," was the quick reply, "and be thoroughly comfortable all winter, too!"

Even Celia could not resist this little thrust, but it was entirely lost on Margie.

The day for the two weddings was a charming one in the morning, and Celia stood in a halo of sunshine to be married, looking very queenly in the plain, perfectly-fitting gown of dark-green cloth. Even Uncle Frost, who had arrived most unexpectedly the night before, regarded her with evident approbation on his wizened features. The house had the same calm, restful air that characterized Celia's self, and the simple feast was served with no suggestion of a preliminary earthquake, for there had been none.

"O, if we could have just such a wedding," whispered Margie's mother to her sister-in-law. "I'm all of a tremble this minute. How can I ever get up that aisle to-night?"

When evening came, rain came with it. Margie was in despair, for there was no awning nor carpet provided at the church. But she had to make the best of her way under an umbrella through the gaping, tittering crowd that lined the walk, her long train slipping from the grasp of the small sister who acted as bridesmaid. The slow march to the chancel where her future husband awaited her, seemed like an endless journey. Her father, on whose arm she leaned, was more at home at his carpenter's bench than at a fashionable wedding, and his coarse, ill-fitting Sunday clothes were very noticeable beside the tulle and satin of the bride. Margie had difficulty to keep step with him. She did not hear the music she had thought would be so inspiring. She felt no elation, but rather a terrible apprehension that some one would blunder. The church looked dim. She noticed that the ladies were mostly in street attire. The rainbow tints and flashing jewels of her imagination had no real existence. The gate of smilax before the altar, for which she had sacrificed a pair of shoes and a dozen handkerchiefs, appeared pitifully scant and small. She caught a glimpse of Celia's face, and hated her for a minute for the look of mingled sympathy and annoyance that she saw there. She was thankful to get to the chancel, the minister and Jo Norris. But Jo was pale and trembling. O, what misery! Would it never end! Her father stepped on her train and stumbled, when he gave her away. Jo searched three pockets for the ring. Something was whispered after the minister, there was a prayer, a peal

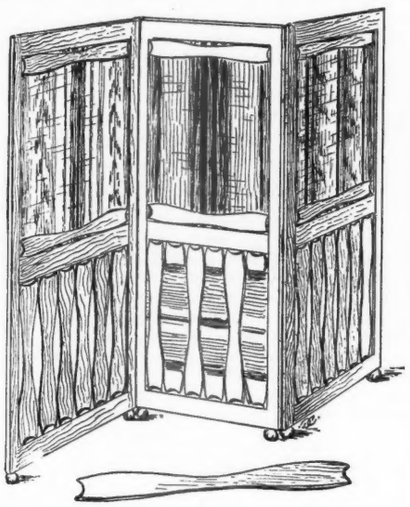


FIG. 1. A NOVEL SCREEN DEVICE.

of organ-music, a sea of curious, half-amused faces, and another long journey. She did not think of her train as she went out to the carriage, and, of course, Jo did not. The snowy satin trailed over the grimy stones, for the small bridesmaid had begun to cry during the ceremony, and had taken refuge with her mother. The carriage door opened, the bride sank back in a crushed and crumpled heap of satin and lace, the groom took his place opposite with both feet planted firmly on the white gown, the horses turned down the street, and Margie's dream was done for.

A few days afterward Mr. and Mrs. Norris were installed in the second-rate boarding house near the pretty home of Celia Winthrop. One evening, the latter invited them to supper.

"O, Celia," said Margie, "what do you think? Uncle Frost has sent us a check for twenty-five dollars!"

"He is very generous," replied Celia, with a happy glance at her husband. "We were remembered, also."

She did not tell how a deed had come in her name to the house and lot that Nelson Winthrop had rented as a temporary home.

"I was glad to get that money," said Margie *sotto voce* in her cousin's ear. "That Leslie girl who gave me a cake basket has sent cards to her wedding, and I must give her a decent present. Then too, I had no winter flannels, and did not like to ask Jo so soon."

It was on Celia's lips to say, "But you had a wedding, dear!"

But her kind heart conquered, and she held her peace.

The Fruit of the Hand Loom.

Does your attic contain, among the useless relics, an old family loom? Take account of the stock in

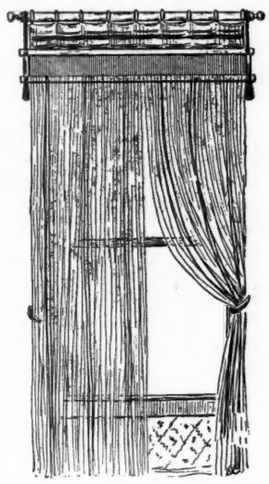


FIG. 2. A WINDOW DECORATION.

hand, and see if the materials cannot be found for the folding screen you have long wanted, and a hall window curtain to rival the Japanese window screens. A quality of gracefully-outlined, old rag-carpet shuttles can be fitted into a simple, paneled frame, as shown in Fig. 1, and by interlacing these with bright stripes of rag carpeting and filling the upper panels with the same, you will have a useful piece of home furniture, with domestic associations that are very pleasant. Stain the woodwork to match that in the room.

If the reed of the old loom is found in good condition, suspend it from your curtain pole with a cord and tassel, fastening with a fancy brass-headed tack at the joints of the reed frame; leave a sufficient space above the reed to hang a strip of bright rag carpet from the curtain rings, or if this is lacking, some plain upholstery goods will answer. Then draw in through the reed a set of cord, twine, or carpet warp, cut double the length of the curtain, drawing each end through adjoining spaces of the reed, leaving the double, or loop, at the back; occasionally drawing in a stripe

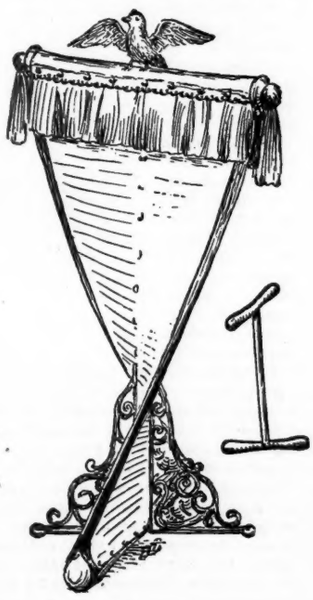


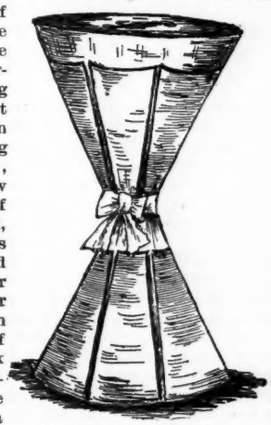
FIG. 3. A SPIRAL SCREEN.

of bright threads to add to the effectiveness of this light window screen, Fig. 2. Perhaps in your search, an old hand reel may be discovered; if so it will form a standard for a novel, small screen, which is easily made; cover each side with a piece of suitable material, binding it at the edges with velvet or plush, and fastening it to the frame with upholsterer's tacks. You will then have a spiral screen, which may be supported by a couple of gilded brackets, inverted and attached to the middle piece at right angles to the arm. The top of the screen may be finished with a fringe and tassels, and if it suits your fancy perch a stuffed bird above the center.

A Handy Sewing Table.

MRS L. D. ELDER.

There is nothing strikingly new or original in the idea of an hourglass sewing table, yet the improvements I mean to introduce in the construction of mine, may be of service to some other busy housemother. As usually made, they somehow convey the impression that they are in imminent danger of breaking in two, in the middle, so for added strength, closer imitation of the original article, and ease of construction by feminine hands, I shall first make two circular pieces of one-half or three-eighths-inch pine board, seventeen or eighteen inches in diameter, joined together by a broomstick, or similar piece of wood two feet long, with grooves cut half an inch each side of the middle and at the same distance from each end. I shall then upholster it with some soft material, in quiet colors. This will require about thirty inches in length, by five and a half or six feet wide, besides allowing for twelve ten-inch squares of the same. These squares are to be folded corner-wise, sewed along both straight sides, having an opening cut along the bias edge, sufficient to allow easy insertion of a person's hand, and these pockets are to be inserted into the larger piece, at regular distances, six in the upper edge of the piece, and six in the lower, beginning at the middle. Run a strong gathering



AN HOURGLASS TABLE.

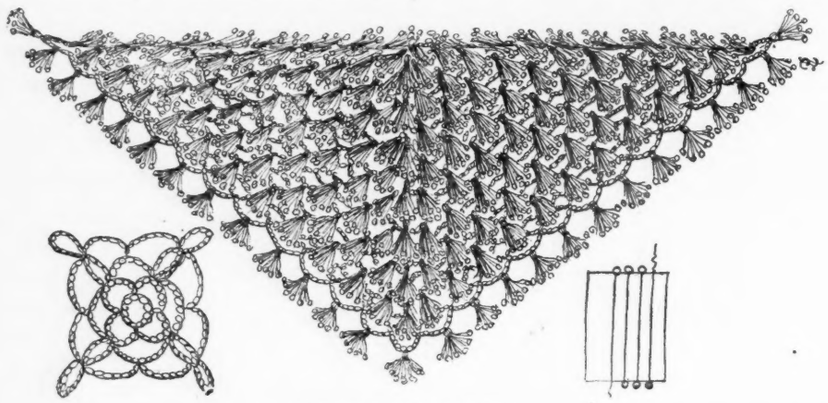
thread in each edge, and in the middle of the large piece, draw the middle gathers close around the middle of the standard of the little table; then with heavy cord doubled, catch the top corner of each of the lower set of pockets, and tie securely into the groove just below the middle, and again tie the square corners into the groove at the bottom of the standard. Reverse the operation for the upper set of pockets, draw the edge gathers close over top and bottom of table, and the upholstering is finished. Now secure three sticks (turned ones are nicer, but plain broomsticks will do) cut them just the length of the part upholstered. Two more circular pieces are of half-inch material, twenty inches in diameter, (or more may be necessary.) Decorate these discs and sticks to suit your fancy, black or white and gold are pretty. When finished and dry, fasten one piece on the top, and the other on the bottom of the hourglass part, being careful to cross the grain of the two pieces to prevent splitting. Small wire nails will do to hold the bottom in place, but brass-headed ones are better for the top, which may also be ornamented with geometric designs worked out with the same. Fasten the three sticks at equal distances apart, to help support the table top; a single nail driven into the end through top and bottom will make all secure. Be sure that they come between two pockets instead of in front of one. Insert three small casters in the bottom of the little table; then it can be easily moved whenever desired, and will always stand steady, which it might not do if four were used. The upper set of pockets being point down do not hold much individually, but will be found useful for a variety of small sewing necessities. The lower ones being base downwards will contain quite a quantity collectively, and be found very serviceable in keeping together, unmixed and conveniently concealed, many of the sewing necessities,

which ordinarily take so much time and trouble to keep "at one's finger ends."

An Ice Wool Fascinator.

LENA J. RINGUEBERG.

Fourteen balls of ice wool, two and one-half skeins of split zephyr, and a good-sized ivory crochet hook are required for making this head covering. The foundation is made in a square, then folded cornerwise, and crocheted together with the outside row, to which the pendants are attached. Begin at the center, with eight chain-stitches and join. The first row around this is made of four loops of five chain-stitches each.



A CROCHETED FASCINATOR.

The second row is also made of five chain-stitches in each loop, with the exception of the extra ones at the corners. Crochet very loosely, particularly where you fasten the loops on to the foundation, for it is into these that you fasten the little tufts of ball. Never forget to increase at the corners, and make 28 or 30 rows. For the balls, take the split zephyr, cut the skeins once in two, take ten strands, and double and tie or knot, at short distances, and then cut. Next, take the ice wool and cut into lengths of 24 inches. Take two of these together, making four threads, and string six balls on each. Wind this around the card, which is three inches in length, as in the illustration, slipping the balls along to the end of the card. Lay the foundation on your lap, with the point toward you, and begin at the center point to put in the tufts. Take the balls at one end of the card between your fingers, holding them in your left hand, then put the crochet hook through the double loops in the foundation, and pull these three balls through, fold, and tie together; then pull three of the balls through the row of chain-stitches just ahead of it, and also the three others through a chain near this. This is to make them lie down smoothly. This fascinator can also be made with a pink foundation and white balls, or a black foundation with white balls, both of which are very pretty.

A Homemade Mattress.

E. R. FLINT.

The materials needed are ten yards of striped ticking, a quantity of husks, shredded finely, a number of circles of leather, cut from the tops of old shoes, a ball of any strong twine, and a mattress needle. This latter article will cost you forty cents if you buy it of an upholsterer, but a needle that will answer every purpose can be made of a brace from an old umbrella. The brace will have a hole, which answers for an eye, at one end, and the other end must be filed to a sharp point. It ought to be about eight inches long when finished, and an inch or two more will add to its convenience. Make of the ticking two ticks, to allow their being turned around; one a square the size of the width of the bed (inside measurement), the other one being of equal length, and of width necessary to fill the space in the bedstead left at the end of the first tick. A six-inch boxing should be made in both ticks, and corded if you wish. Stuff the ticks with the husks, using about thirty-five pounds for the two. Tie evenly and tightly with cord, placing a circle of the leather, about an inch in diameter, at the top and bottom, to prevent the cord pulling through. The husks saved while the corn is green are the best, and it is a good plan to save those from the sweet corn used in the family; but those gathered in the fall at husking time, or from the seed corn which has been strung up, will answer, rejecting any that are hard and stiff. Excelsior may be used instead of husks, but it is not so durable, and marsh hay makes a good, cheap mattress, if tied in the same way. Where feather beds are not used, something is needed to lay over the mattress. Nothing is better for this purpose than a light mattress made of cotton batting. Ten yards of ticking and twelve pounds of batting are required. Tie with a darning needle and twine, in squares four inches apart. Too many farmers' wives get along with straw beds, with their dust and litter, when the material for a good mattress, either husks, or wool, is on every farm, or can easily be procured.

Buying at Wholesale.

ELLA ROCKWOOD.

Nearly every farmer may do this, and he will be astonished at the amount of money saved by such an investment. Any merchant will make it to your advantage to buy in quantity and pay cash rather than dole out a little at a time and "charge it."

Go to a reliable grocer and ask him to make you out a bill of a supply of standard groceries, as may be safely bought in quantity; such as tea, coffee (unground), sugar, of two qualities, white and brown, molasses, rice, raisins, crackers, kerosene, soap, starch, telling him you wish to pay cash for it, and you will save big interest on the investment even if you are obliged to borrow the money. There are times perhaps, when nearly all farmers are obliged to borrow to tide them over for a short time, or until a crop can be marketed, but it should be avoided as far as possible. The list may be added to at pleasure, and money saved on such goods as spices (unground or closely sealed), flavoring extracts, lamp chimneys, yes, even the inevitable tobacco if the farmer must use it. The following are some discounts that may be obtained by purchasing in quantity. Of course prices vary somewhat in different localities, and those living near a large city may be able to do much better, but these, I think, will be the average: On sugars, as any grocer will tell you, there is very little profit, yet in buying a barrel, you will get a discount of a cent to a cent and a half a pound, which means a saving of three or three and one-half dollars on a barrel of granulated sugar. This grade is the most desirable one to buy, as it neither becomes lumpy nor hard from standing, but is always as nice as when first opened. In tea there is a greater discount; ten pound lots selling usually at five cents at least below the regular price. Different qualities have different discounts, the higher priced teas giving less than the cheaper grades to the grocer. In coffees, too, the discount varies with the quality, but, on an average, five cents may be deducted from each pound if taken in ten pound lots, and perhaps more in larger quantities. Crackers by the barrel, come at six and a half to seven cents for the kind usually retailed at ten cents a pound. One thing that may be generally known, is that when crackers have lost their crispness, they may be made like new by thoroughly heating them in the oven.

Kerosene oil should be kept in a galvanized-iron tank or barrel, provided with a faucet, or it will evaporate so rapidly that there will be no profit in buying it by the barrel. Such a tank will, with care, last for many years, and save the annoyance of taking a small can to the store for oil, every little while. Laundry soap of any standard make by the box, holding from 50 to 75 bars, may be purchased at about two-thirds its retail price; and the soap hardens when taken from the box, divested of its wrappers and piled loosely so that a bar will last much longer than when first bought. Starch can be counted at the same discount as soap, and perhaps a trifle more.

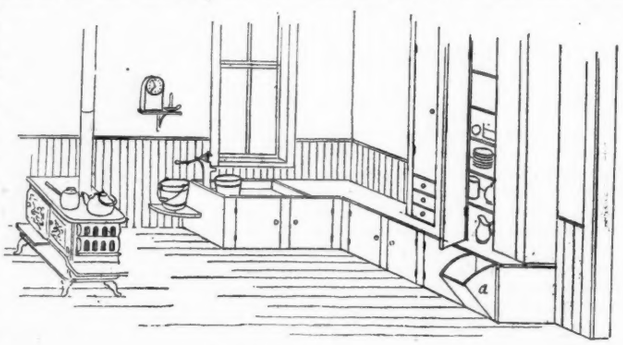
After you have obtained a full line of groceries, go to a dry goods dealer and buy a bolt each of bleached and unbleached muslin, one of pillow-case cotton and one of crash. Hose by the dozen, assorted sizes if you wish, will give you a good discount, and thread the same.

Perhaps not every farmer is "forehanded" enough to carry the purchasing for his family to this length; but every one, surely, can buy a barrel of sugar or a box of soap, thereby making a beginning which will certainly increase as he realizes the immense saving in so doing. But whatever you buy, be it much or little, buy of good quality, for nine times out of ten the best is the cheapest in the end. Any cook will tell you that granulated sugar will "go farther" than brown, as on account of its dryness and extra sweetening properties less is required; and we all know that cheap dry goods are quite apt to look dingy and faded soon after they are made up. Economy is best practiced in quantity rather than in quality in buying household supplies as well as in other directions.

A Well Arranged Kitchen.

L. D. SNOOK.

The convenient arrangement of the kitchen and its proper location relatively with the pantry, dining-room and cellar, have much to do with expediting domestic work and saving steps. These things may appear to be of minor importance to the man of the house, but not to the woman, who is obliged to spend half her waking hours in this room. In houses already constructed, changes may be made, embodying at least some of the points herein outlined. The position of the sink, etc., in the sketch may be changed, if necessary, as it will be equally serviceable in any other corner. Always aim to have the cistern-pump placed in the sink, or, at least, on a table or bench adjoining both for convenience, and also that the dripping from the spout will fall into the sink. The latter, whether of wood or iron, should have a good outlet pipe so arranged that it will not freeze in winter. If the cistern is in the cellar, beneath the sink, run the outlet pipe from the sink into the overflow pipe from the cistern. This entails plumbing to prevent the escape of gases. Do not neglect to have a good-sized window facing the sink, that all culinary work may be done in a good light. The top of the sink and all adjoining stationary shelving should be about two feet six



KITCHEN CONVENIENCES.

inches high. The tall cupboard at the right is stationary, and has four doors in front, and the same on the opposite side, which open into the dining-room. In fact, this is intended for and used as a pantry, and is equally convenient whether the table is set in the kitchen or dining-room. The shelves are fourteen inches wide, and should be four or five in number. If space can be spared, five instead of four doors may be used. The three drawers shown may be used for the cutlery and linen. They also open into either room. Under the sink, pantry, etc., are closets provided with doors, in which can be kept the kettles, tinware, etc., while below the first cupboard to the right is the tilting flour bin. It is made wedged-shaped, the lower end resting in a groove made above the floor. It is shown open, and is easily tilted back and forth, as required, and should hold at least 100 pounds of flour or meal. If the well is not situated so the pump leading to it can be placed on the sink, then the water pail will find a convenient home on a bench or little shelf one foot from the floor beside the sink and convenient to the stove. When the stove reservoir is within three or four feet of the cistern pump, it may be readily filled by a short portable pipe extending from the pump to the reservoir. A clock and a lamp are placed on a shelf above the water pail. If there is only one outside door in the room, do not locate it too near the stove, as it will be opened more or less frequently, and the unavoidable draft of cold air will often interfere with the baking.

Two New Screens.

These forms of screens are intended for the table as lamp screens, but may be adapted in size to any purpose desired. The standards may be home-made and of simple form, according to the mate-

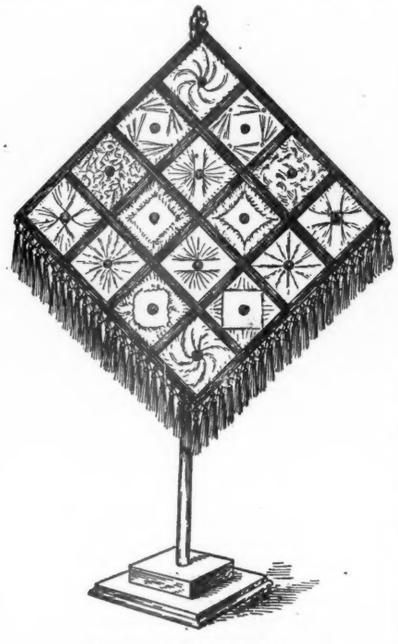


FIG. 1. AN ODD SCREEN.

rials and skill used, or may be obtained from a cabinet maker or brass fitter, if metal is preferred. For screen No. 1 make the frame of reglets, such as printers have, cut about 15 inches long, crossed and securely fastened together in the form shown. Cut a piece of stiff lining canvas 15 inches square, and 16 pieces of some plain, light-colored silk four inches square, and mark the center of each piece. Lay the frame on the lining, and mark upon it the outlines of the reglets, marking also the center of each panel. Then gather the edges of the squares evenly all around and sew them on the lining so that the reglets will cover the edges when in place; sew a velvet button or a silk ball on the center of each square through the lining, and arrange the folds of the puff by hidden stitches. These folds may be all alike, or all different, as in the sketch. Cover the reglets with bands of three-fourths inch velvet ribbon to match the buttons, and line the back with same color. Finish at the bottom with fringe.

The fan-like frame in No. 2 is also made of reglets radiating from a center at the top of the standard and covered with velvet, as in the first design. These should be about 11 inches long, forming a fan of 10 inches radius; cut a semi-

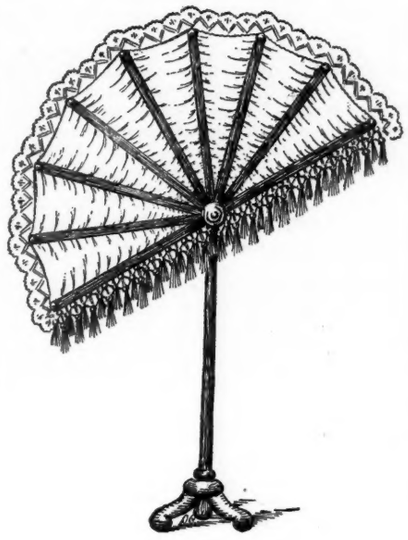


FIG. 2. FAN-SHAPED SCREEN.

circular lining of this size from canvas and mark out the frame upon it as before. Cut off the circular edge from point to point so as to give the angles at the top; then fill in the panels with puffs of silk, cut with a pattern a half-inch larger all around than the panels, gathering the edges and setting them on, as in the other screen. The back should be similar to the front of the screen. Finish with lace at the top, and fringe at the bottom.

A Homemade Skirt-Form.

GERTRUDE CREUSHAW.

A skirt-form that answers the purpose quite as well as the purchased ones can be easily made at home. Have a block two inches thick and a foot or more square, bore a hole through the center, and fit into it a wooden rod a little longer than the dress skirt. Then from a pine board saw a circle just the size of your waist. Screw this securely to the other end of rod; fasten seven dress-reeds to the board by tacking through the eyelets of the reeds, (place them so that one comes in the middle of the back), with two reeds make a hoop that fits loosely over the hips and place this under the reeds five inches below the waist. Tie firmly wherever the reeds cross. Care must be taken to bend the reeds the shape of the figure. A second and slightly larger hoop should be placed five inches below the upper one. (See Fig. 1.) Place over the reeds a small hoopskirt, from the bottom of which several rows of wire have been removed; fasten the skirt to the reeds wherever needed, sew tapes to the edge of the skirt at regular intervals and draw them down and tack to the block. This holds the skirt in position. Fig. 2 shows the "form" complete, and though not a thing of beauty, it certainly is a joy—when a woman has to drape her own dresses.

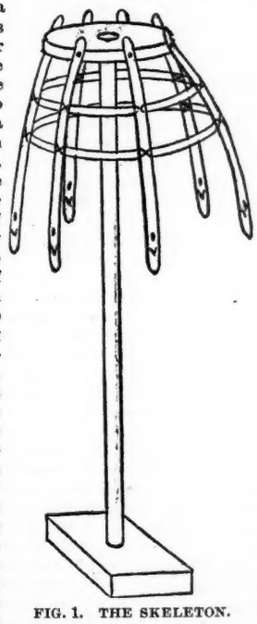


FIG. 1. THE SKELETON.

Crape Made New.

KEZIAH SHELTON.

A critical, somewhat over-particular friend surprised me once by the apparent carelessness with which she wore the finest of crape, both in veils and dress trimmings. I remonstrated one very damp day.

"It will not hurt it. Crape is really very easily managed; I dread nothing but grease. In the days when we wore our veils over our faces, they were apt to get what was as bad as grease from our breath, and then the dust would stick to it. But mere dust and dampness I do not mind. The first I brush off with my soft brush each time after wearing it. Then, as it is free from dust, I do not mind coming out if it is as wet as this morning. Well, it is pretty limp, is it not?" and she took her bonnet off and surveyed its esthetic, lanquidity of texture.

"Have you a large newspaper handy?" and she proceeded to unpin her veil from her bonnet as composedly as if it were part of her usual duty. Then she folded it, with my friendly help, down the middle placing the edges evenly together. The Sunday paper I had tossed on the table was deftly rolled, and the veil rolled on it in a trice, and the whole taken to the kitchen and set close to the range.

In a short time the veil was dry and looked as fresh as new, and when she had pinned it on her bonnet she looked it with satisfaction beaming from her dear, old, trusty eyes, "There, coming out in the rain has been just so much gain. I have

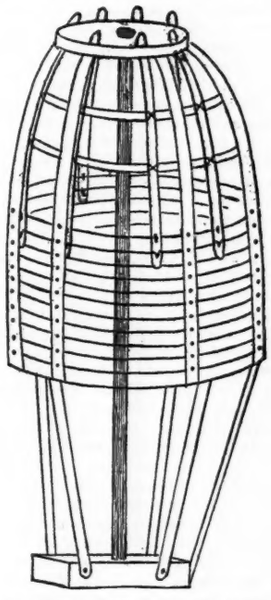


FIG. 2. THE COMPLETE FORM.

felt for weeks that I ought to renew this crape, it was getting so mussed, but I have not had the time to spare to wet it thoroughly and fold it down and dry it."

"Is it possible you take your veil and deliberately wet it as the rain did to-day, and then fold and dry it?"

"Certainly it is, only at home I have a stick to roll it on. I wet it pretty well, and spat it in my hands till it is wet all over. So I do with the trimmings on my dresses. I have had this dress three years, and I have kept it looking well by cleaning the goods when needed, and twice I have taken off the crape vest, collar and cuffs. After treatment, I have arranged them somewhat differently with other pieces I had on hand; acquaintances are permitted to think it a new gown. There is no harm in that, is there?"

"If there is, it is too trifling to be noticed in comparison with what we have to submit to daily; but how do you clean your gown?"

"I boil a teacupful of soap-bark for two hours in two quarts of water, strain through a fine cloth, and put into two large quart bottles. As in two hours it has boiled away some, neither bottle will be quite full. Into each half of this, or into each bottle I should say, I put three tablespoonfuls of liquid ammonia, then I fill the bottles with clear water, cork tightly and it will keep until used.

Glass-stoppered bottles, of course, are best. I always give one bottle to my sister, who also wears black, and there is no need of each of us making it, as it is no more trouble to make for two than one."

"I think a pair of rubber gloves should be worn in using all these cleansers, even if one is not sure of the biting presence of ammonia; in any cleanser there must be something quite strong or it would not accomplish its work thoroughly."

Juvenile Styles.

If the "eternal fitness of things" is ever to be considered, it is in the dressing of young girls, especially those who have reached the awkward age between twelve and sixteen; the age when the overgrown child is termed "a miss," when hands and feet are apt to be painfully prominent, and the figure is thin and unformed, or else clumsily stout. Taste in the making of clothes can do much, at this period, to conceal defects, severe, straight outlines being carefully avoided for the slender little maid, and all full, fussy trimmings for Miss Roly-Poly, who will be a fine-looking woman when she acquires some shape.

"Give young girls plenty of cotton dresses for summer wear, and trim them in a simple manner, that a clean one may not become a luxury," says a well-known fashion correspondent, and the bit of advice is wise, while we are sure these need never lack variety, as we toss over the dainty figured lawns, prettily striped ginghams, flowered satines and dimities, cotton crêpons and Bedford cords which heap the counters this spring.

Very narrow stripes of blue, brown, green, violet, or rose, alternating with white, are prime favorites for play and school frocks, and these are made up straight, rather than bias, as they were last year. The skirts have a five-inch hem, and are quite full, with most of the gathers massed in the back. The high-belted waist is given a blouse effect by being gathered on the shoulders and drawn down each side of a V of embroidery, set in the top of the front. The same needlework forms a turned-down ruffle around the neck, and appears as cuffs on the mutton-leg sleeves. The bodice is confined around the waist by a belt of insertion. Another pretty style is the round waist, which tucks beneath the dress skirt, and is trimmed with a small, pointed yoke of embroidery. This is a good design, also, for thin white gowns, and may be made extremely dressy by a girdle, floating ends, bretelles, and shoulder knots of satin ribbon. For these silken decorations, three widths of ribbon are used, Nos. 7, 9, and 12. Well-grown maidens frequently have the yokes of their ginghams and dimities shirred on cords, and the bodice drawn in at the waist line in the same manner. A zouave jacket is then simulated by white embroidery that has a scalloped edge, extending from the shoulders under the arms, and tapering off in the back. The tiny frill formed by shirring gives a finish to the neck, and there are three rows of gathers at the wrists. A velvet ribbon, two inches wide, encircles the waist, and is tied in a bow, with very long ends behind.

The long Greenaway gowns, in which the little ones were more picturesque than comfortable, are now somewhat *passé*, and there seems a movement toward excessively short skirts, barely reaching the knee, to such extremes does the pendulum of fashion generally swing. Most sensible mothers, however, choose a medium course, the wee lass between four and ten wearing a frock that extends about half way betwixt knee and ankle. At 12 years it nearly reaches the ankles, at 14 it touches the shoe-tops, and at 16 it is within three inches of the floor. Almost all waists for tiny women have yokes, or else are cut low and worn over guimpes, which remain as fashionable as ever, their only novel feature being a deep frill of lace, sewed to a round collar and falling low on the bodice and over the tops of the sleeves. The daintiest are of white China silk or sheer mull, neatly shirred and feather-stitched.

A cunning pattern for baby girls and boys is a slip or very short-waisted frock, with full, high puffs on the shoulders, and worn over a guimpe, the sleeves of which are long and close instead of loose, as is most customary. To allow for growing, the sleeves can be tied up inside with strings, and let down as required. Master Two-year-old sports a Russian dress of piqué or Bedford cord, made all in one piece, gathered around the waist on cords and buttoned down the left side; or else he has a box-plaited skirt and round waist, the latter having a deep revers collar, edged with embroidery. His play hat is of Chambéry, with a shirred brim and Tam o' Shanter crown; while for best he has one of the season's novelties in straw and silk. His brother of five sticks to the ever-popular sailor suit.

Exquisite little party gowns for girls of all ages are fashioned of the all-wool challies, crêpon, silk, or China crepe, and trimmed with a deep bertha of *point de Gênes* lace around the low neck; while moiré ribbon, matching the color of the frock, forms a girdle about the waist, and hangs in a Watteau bow from between the shoulders.

The Children's Room.

ALICE CHITTENDEN.

It is not possible for every one to have a nursery proper for the children, but there are many good-sized country houses where a room might be set aside for them and fitted up with such simple and inexpensive contrivances as would not only make them happy, but would often relieve the busy mother of their care. The furniture for such a room should be of the simplest. A closet in the corner for the toys is made by fitting a triangular board about three feet from the floor. It is finished by a curtain in front shirred on a wire. The table should be low enough for the children to work at comfortably when seated on a settee, or chairs, which allow their feet to touch the floor, and should have no sharp angles, but rounded corners, that no little heads may be bruised during a merry game of romping. Both of these articles may be made by an ordinarily skillful father. A space on one side of the room, or on more than one side, for that matter, should be painted with a prepared blackboard mixture; under this, fasten a narrow cleat of wood to the wall, on which may rest pieces of chalk and a cloth, chamois or sponge for erasure. This may foster the genius of an embryo artist, and will certainly afford a pastime for many hours if the mother or some older sister will now and then give them simple lessons in writing numbers, making letters and playing slate games such as "fox and geese" and "tit-tat-too."

Many parents spend more in a single year in toys for their children, which often are unsatisfactory as a means of amusement, than would suffice to furnish such a room as we have described. No carpet is required; indeed, it is better without it. Have the floor stained a dark oak color and varnished. Here and there lay strips of gay rag carpet, or a cheap fur rug or two, or rugs of home manufacture. Across one corner fasten a six-inch strip of board, and in the inclosed space put a bushel of clean sand, sea sand, if possible. Provide several toy tin pails and some little shovels, and teach the children that this sand is to be kept well in its corner. This will be needed only for the very little ones who cannot go out of doors in winter.

Many lessons of order and neatness can be taught in this room. Have a tiny dustpan and broom, let the children take turns in using it and have separate days for each to assume the care of the room. The youngest child can be made to feel a pride and proprietary interest in what is his very own, and they will soon take pleasure in "tidying up" their room at night, and they can be encouraged by the promise of a visit from mamma before supper.

Don't give them everything at once but let one simple amusement be added after another. On some stormy day in winter, when everything else has failed, look over your piece bag and select all the pieces of bright silesia or paper muslin from which you may cut folios of any given size. Set the older ones at work in cutting out pictures from illustrated papers that you have laid aside for the purpose. One of the girls may be allowed to make the paste for this scrap book, and all will be interested in pasting in the pictures. There may be a pleasant rivalry as to who shall arrange the prettiest pages, and it will be a continued source of pleasure to them to look over this book with their little schoolmates.

This is practically a home kindergarten. If the children are too small to be left alone, then it is pleasant to have such a room where the mother can spend an occasional hour with them at her sewing. You will need no better adornment for the walls than the colored illustrations which come with many weekly papers and texts of mottoes in the simplest rustic frames of bark or moss. A set of Scripture texts in large type will afford a means of instilling one now and then into their baby minds, and will act as a stimulus toward learning to read, for a child will soon begin to spell out the words which he has before committed to memory, and consequently can pronounce without difficulty. Later in life, years of exile from home will not efface from the memories of sons and daughters the delights and scenes or this "children's room."

Pictures and Picture-Frames.

WEBB DONNELL.

A taste for good pictures frequently comes only by education, just as many have to be educated to an appreciation of good books. The two things are not necessarily connected, however, since many who delight in good literature have very imperfect taste in pictures. Now a chromo, which is generally regarded as the crude in pictorial matters, is not necessarily bad because it is a chromo, but because of the prevailing tendency in most of them toward gaudiness in color and untruthfulness in drawing. A picture, to be really fine and capable of affording intellectual enjoyment, should be true to life and nature in drawing; harmonious in its coloring, or, if merely black and white, in its light, and should appeal to one's better nature in the meaning that it conveys. Mere prettiness in a picture will convey no lasting charm to a cultivated mind. A glance or two at such is sufficient, and a repetition becomes tiresome. The pictures on the wall ought not to be there simply for ornament, but to afford daily intellectual enjoyment; and, as they are to become so permanent a part of one's life, it is specially important that they be so good as to wear well. The popular, jingling tunes that come to the surface for short seasons, are pleasant enough to hear for a few times, but to hear them every day would soon drive one well-nigh distracted; but some of the grand old songs have lived for years, and seem as beautiful to-day as ever. One's pictures ought to be of a kind that will satisfy the mind in the same way; and they can be, for the world is full of beautiful paintings that appeal to the highest qualities in human nature. These are accessible only to the few, yet the marvelous reproductive processes of our day multiply these grand creations by millions for those whose means for gratifying their tastes are limited.

Good photographs, made directly from the originals of great paintings, are among the cheapest and most satisfactory reproductions. There are numerous other forms of production that give very good results, most of which, however, depend, to a greater or less extent, on photography in their execution. The great point is to make a proper selection, and, if one feels distrustful of his or her taste, call in some friend well fitted to give advice.

The benefit to children from association with good pictures, such as Millet's "Angelus," Guido Reni's "Mater Dolorosa," or G. F. Watts's "Love and Death," cannot be fully estimated. Other pictures, more suited to the undeveloped taste of young people, will be better understood by them, but even such ones as those mentioned will soon grow to have a meaning for them that will be of vast benefit in forming refined tastes.

Now a word about picture-frames. An artistic picture ought to have an artistic frame, and these are to be had both at large expense and at a very small outlay. Bronze, of good quality, and gilt frames are handsome and in excellent taste for many kinds of pictures, but they are costly. The cheap bronze and the cheap gilt frames are snares and delusions; they are cheap and look cheap from the beginning. Much better are the natural wood frames of oak, ash, or other timber having a handsome grain, made flat, and of a width to harmonize with the picture or the size of the matting around it, if one is used, and having a narrow band or beading of fine bronze or gilt molding within it. Such frames are inexpensive and in good taste, as are also the ivory-white enameled frames, with a fine, narrow gold beading or plain band inside. This ivory-white finish is a preparation that is added to a wood surface, like painting.

Photographs of heads, like the "Mater Dolorosa" mentioned, look best when framed in a wide, flat moulding, without any margin of white, but landscapes, and many other subjects, need a light mat around them, or a margin of light color, in which case the moulding need not be so wide. Water colors usually look best with a wide mat and quite a narrow moulding.

Bill Jack.

HENRY D. TAYLOR.

"Bill, who is the little chap over on the corner?"

"Dunno, never see him afore."

"Doesn't act as though he knew much, does he?"

"Looks just as if he couldn't see. I'll go over and talk to him a little."

"Bill Jack," or William Jackson, which was his real name, went across the street to the little newcomer.

IN THE WATER BUTT.

"What's your name, bub," he asked, as he came to the boy.

"Joe," replied the boy.

"Anything besides Joe?"

"Yes, I'm Blind Joe. I can't see anything."

"How did you get here?"

"I don't just know. I remember that I was sick in a hospital. I don't know how I came there, or where I was before I was there."

"How did you come on this corner?"

"They told me at the hospital that I was well so I couldn't stay there any longer. Some one put me on the cars and sent me to Boston. When I found myself on the street I didn't know where to go, because I couldn't see. I came so far and stopped."

"Have you any father or mother?"

"I don't know as I have. My head aches dreadfully when I try to remember."

"Then if you are blind and haven't any father or mother, you'd better belong to me for a while. If you stay around the streets, you might be killed. Can you holler 'Herald! Globe! Journal! Traveler!' like the other fellows?"

"O, yes," and he cried the names as loudly as any of them.

"That's right. Now we'll go in company. You do the yelling and I'll make the change."

So Bill took the boy by the hand and they went down the street together. In less than an hour most of the newsboys knew that Bill Jack had adopted a blind boy, and they also knew that the boy must be treated well. Bill was a good-natured fellow, but he never allowed anyone who was small or disabled to be imposed upon. For several weeks the boys kept together. Joe did exactly as Bill told him, although sometimes he did not seem to know what Bill wished till told several times. Bill began to think that the boy was a little crazy.

During the summer Bill occupied as a place for sleeping a large water-hogshead that was lying on its side near one of the wharves. He had permission to do so, from the owner of the premises, and so was not disturbed by the policemen on that beat, who all knew and liked the little fellow.

One morning, when he awoke, Joe was talking about railroad accidents, and throwing his arms about in the air trying to seize hold of something. Bill tried to quiet him, and when he succeeded, started out to find a doctor, for, boy as he was, he knew that Joe was very ill. He went to a number of places, but he could not find a doctor who would attend a patient that lived in a water-butt, even though Bill promised to pay and showed five dollars which he had saved. He finally remembered Dr. May, one of his regular customers, and started for his house.

"Well, my lad, what can I do for you?" asked the doctor, as he came into the room where Bill was waiting.

"My boy's very bad this morning, and I came to see if you would come down and see him."

"Your boy! Who is your boy?"

"It's blind Joe, sir, I found him on the street. He couldn't see, and I just kind of adopted him and he lives with me in a water-barrel down in Mr. King's storeyard."

"I'll go down with you," said the kind-hearted doctor, and taking his medicine case, he followed the boy to his queer lodgings.

When they arrived, Bill said: "I'll have to get in and hold him up to the door so you can see him," and he went in through the square hole which was cut through the head of the hogshead.

As he held Joe in such a position that the doctor could see him, the little fellow moaned piteously. The doctor saw at once that the child was ill with fever and must be carried where he could have good care. He directed Bill to go to the corner and call a hackman.

The sick child was placed in the hack and a drive of ten minutes brought them to a plain, neat house on a short street, where the doctor told Bill to ring the bell. An elderly lady came to the door. "Here, Auntie, I've a patient for you," said the doctor.

"Bring him right in; I have a room all ready for him," said the lady as she led the way into the house.

After carefully examining the boy, the doctor wrote several prescriptions and sent Bill out with them, giving him the money to pay for them. When he returned, he found the doctor had gone, and the lady, after giving some of the medicine to Joe, said to him:

"The doctor tells me that you are a good boy, and that you sell papers for a living. What is your name?"

"Bill Jack."

"Is that your real name?"

"No'm. My name is William Jackson, but I've been called Bill Jack so long that I forget what my real name is."

"My name is Mrs. Jones, but I think you had better call me Aunt Susie; I shall call you Willie, for I don't like to call you Bill. How old are you?"

"I'm most twelve."

"The doctor told me that you and Joe lived in a water-butt. Where are your parents?"

"My father was drowned at sea when I was a baby, and my mother died 'bout three years ago. I lived with a woman who had rooms next to ours, on Lewis street, but she beat me, so I ran away. Since then I've taken care of myself."

"Would you like to live with me while Joe is here?"

"Yes'm, if I can work enough to pay you."

So it was arranged that Willie should sell papers morning and night, and help Mrs. Jones the rest of the time. He worked hard and was able to earn considerable money, all of which he gave regularly every night to Mrs. Jones. Joe was very ill for two weeks, and the doctor did not give Mrs. Jones much encouragement about his recovery. At last came a night when the good friends of the poor little waif watched anxiously by his bedside knowing the crisis was near. The doctor stood ready with a little cordial to moisten his lips, while Aunt Susie fanned him gently to keep the breath of life in the poor little body.

For an hour after midnight not a word was spoken. Then the doctor said: "There, the crisis is past, and he is sleeping."

"Will he live?" whispered Willie, who had silently crept up to the bedside.

"Yes, Willie, I think we have saved him. But he will have to be kept very quiet for some time yet, and now you must go to bed."

When Willie went out in the morning, Joe was sleeping quietly and Aunt Susie was watching beside the bed. She left the room for a moment, and when she returned, Joe was awake and looking around.

"Where am I?" he whispered, as his eyes fell on Aunt Susie. "Where is mother?"

"You are with friends who will care for you, but you must not talk. You have been very ill but you are going to get better now, and as soon as you are well enough, I'll tell you all about it."

The boy seemed satisfied and went to sleep. He did not waken again until Willie came back from selling his morning papers, and was sitting by the bed watching him. As Joe opened his eyes, he asked: "Who are you?"

"Why, Joe, don't you know Bill Jack? You've been my boy for more than three months. You can see, now, can't you?"

"Yes, I can see, of course. I always could."

BILL'S BLIND BOY.

Aunt Susie came in, and finding Joe awake, asked, "Well, Joe, how do you feel now?"

"I think I'm better, but everything seems so strange. Where is my mother?"

"That is what I want to know. What is your name?"

"Joseph Stetson. I remember now. Some one cried out, 'The train is upon us, jump for your lives.' Then there was an awful crash. That was the last I knew."

"Well, you must not tell any more now, for you will get too tired. Willie and I will look for your mother and father as soon as you are a little stronger."

Joe lay very quiet looking at Willie and soon dropped off to sleep again. The doctor came in soon after and was told what the boy had said.

"I hoped the fever would clear his clouded

brain, for I was convinced from what Willie said that the boy was not in his right mind. You say he can see, too?"

"Yes, his eyes are as clear as any one's," said Aunt Susie.

"I am relieved to know that. I was afraid the trouble with his eyes might be permanent. I think this fever was the best thing that could have happened to him. Now I think I'll put an advertisement in the papers. That will be the quickest way to hear from his friends, if he has any. I wonder if there was an account of the loss of the boy in the papers at the time of the railroad accident," said the doctor, more to himself than to any one in the room.

"I remember lots of accidents, but I don't remember hollering about a boy lost. If you wish, I'll go up to the *Herald* office and look over the file and see if I can find anything," said Willie, who was always ready to do something for "his boy."

Willie started at once and the doctor went into the room where Joe was sleeping, and sat down by the bed. In a few minutes Joe said feebly:

"Mother, I want some water."

The doctor gave him some drink, and then Joe asked: "Where am I, and where is my mother?"

"You are with friends in Boston. We will send for your mother as soon as we find out where she is."

"Then she wasn't killed on the cars?"

"I don't know, my boy. We have not been able to learn, as yet. Where did you live?"

"At Passadena. We left there for a visit to my uncle in Colebrook, New Hampshire, and the accident happened on the way."

"What is your uncle's name?"

"Martin Ames."

"Don't talk any more now, for you will get too tired. Take this medicine and go to sleep again, and I will send to your uncle and find out about your friends."

Joe took the medicine and was soon asleep again, while the doctor sent the following message by telegraph:

MARTIN AMES, Colebrook, N. H. Your nephew, Joseph Stetson, here very sick. Can you come to 21 Wilson street, Boston, at once? DR. MAY.

About two hours later the doctor called on his patient again and found him still sleeping. He also found that a telegram had been left there for him, which read:

DR. MAY, 21 Wilson street, Boston. Will be there at earliest possible moment. Do everything possible for boy. MARTIN AMES.

"It is from his uncle," he explained to Mrs. Jones, "and he will be here to-morrow morning. He is evidently a well-to-do man, and I'm glad, for he will be able to do something for Willie, in return for the care he took of this lad."

The next morning about nine o'clock the bell at No. 21 Wilson street rang and Mrs. Jones went to the door. A fine-looking gentleman stood on the steps.

"I am Martin Ames, the sick boy's uncle," he explained.

"Joe is asleep now," said Mrs. Jones. "Will you step in and look at him?"

"I do not know that I shall know him, as I have not seen him since he was a baby," replied Mr. Ames, as he went into the room where Joe lay. "How the poor boy has suffered! Still, I see a look like his mother. How came he here?"

Mrs. Jones told him all about the lad as she had learned it from Willie, taking care to give him full credit for his unselfish action in caring for the boy. When she had finished, Mr. Ames said: "My sister and her husband were both killed in an accident on the railroad, about four months ago. I came on to Boston and claimed the bodies, for they were brought here, and carried them to Colebrook for burial. I knew they had a son, of course, and supposed he must have been with them, but I could not find any trace of him, and, until I received Dr. May's telegram, I had no clew to his fate. I came back to Boston after the funeral and stayed a week, but I was obliged to return without tidings, and I had given him up as dead. I am so glad I have found him. I have no children and shall regard him as my own. Where is the boy who took care of him?"

"He is a newsboy, and is out selling papers. He is an orphan, and was living in a water-barrel, where Dr. May went to see Joe, and from whence he brought them here."

The doctor came in at this point, and Joe awoke. After examining his patient, the doctor was introduced to Mr. Ames, who asked how soon the sick boy could be removed.

"Certainly not for a month to come," was the reply. "He is having the best of care here. Mrs. Jones is an experienced nurse, and I know of no one with whom I would sooner trust a patient."

"I shall not move him till you say it is perfectly safe, of course. I want you to do everything you can for him, for which I am well able to pay. Mrs. Jones has been telling me about the newsboy who took care of him, and I shall take him home with me also."

"I'm glad of that, for I think the boy has the making of a good man in him, if he only has the chance. Here he comes now."

Willie came in and wiped his feet and hung up his old hat before he came into the room where the doctor and Mr. Ames were sitting. He was dressed in an old suit of clothes, but his hands and face were clean and his hair brushed. Since he had been living with Mrs. Jones he had taken unusual pains to keep clean. As he entered the room, the doctor said: "Willie, this is Mr. Ames, Joe's uncle."

"I am very glad to see you, my boy, and to know that you took such good care of Joe," said Mr. Ames, drawing Willie to him.

"I am very glad to see you, too, and I'm glad to know Joe's going to have a good home, but it'll be lonesome when he's gone," and there was a moisture in Willie's eyes that made him walk away and look out of the window.

"I don't think I shall take him away from you."

"You don't mean that you'll let him live with me down in my barrel?"

"No, I think that would not do as well as it would to take you home with Joe. Would you like to go and live with me?" asked Mr. Ames, taking him by the hand.

"Yes, sir, very much; that is, after I have earned enough to pay the doctor and Mrs. Jones."

"I'll pay all those bills. You took good care of Joe, and as I have no boy of my own, I'm afraid Joe would be lonely without you, but you will be company for each other."

One afternoon when Joe had so far recovered as to be able to sit up, he said to Mrs. Jones who was alone with him: "Aunt Susie, I know now why I like Willie so well."

"Why is it, dear?" asked the lady.

And Joe told her that he dreamed he lived with Willie once, and that he took good care of him, when he could not see. Mrs. Jones was greatly surprised to find that he thought it a dream. She explained to him that Willie did really care for him, and why they were both at her house. When Willie came in Joe called him to his chair and said:

"I was telling Aunt Susie about a dream I thought I had, and she says it is not a dream, but that I *was* blind and that you took care of me. I know now why I like you so much. I'm so glad we are to go together. I believe if Uncle Martin would not take you home, I should not go, but would stay with you."

"I'm glad I'm going, too, for I didn't want you to go without me. When you get well enough, we'll go down and see the barrel we used to live in, and see some of the boys, if you would like to."

The boys did visit the old barrel, and saw many of their old companions before they went, and when they left Boston with Mr. Ames, many of the newsboys were at the depot to see them start. Joe gave each of them a gift as they came to shake hands, and they left many a happy boy on the platform when the cars drew out of the depot.

Mrs. Ames, or Aunt Alice as she told both boys to call her, gave them a warm reception and Willie was asked to tell her all about himself and his odd home in a barrel. The next day when Mr. Ames came in at noon he said to Willie:

"I think I shall change your name. I have been to see a lawyer, and he has made out some papers, so that I can have you for my boy, and hereafter you will be William Jackson Ames, and my son. I will legally adopt you, and you may call me your father and Mrs. Ames your mother."

Willie looked from one to the other with astonishment. He had taken care of himself so long that he could hardly realize that these people were going to be his father and mother. He tried to speak, but the tears came into his eyes, and going to Mrs. Ames, who was holding out her hands to him, he put his head in her lap and sobbed, "I'm so glad."

A week later Willie and Joe began to go to school, and both are doing finely. They are so much attached to each other that Willie will not go into a higher class than Joe lest Joe should be lonely, and Joe thinks that whatever Willie says and does is exactly right.

Mr. and Mrs. Ames never tire of talking of the two boys, and both agree in saying that it was a happy day when they adopted Bill Jack.

A Glimpse of a Dryad.

STELLA LOUISE HOOK.

In the bygone days, according to the writers who lived at that time, every tree had its Dryad, a delicate nymph, who dwelt within it, and whose life ended when the tree died, or was cut down. Most people think that there are no Dryads left in our woods to-day; the axe and the saw have been too busy. But that a few yet remain I was convinced one spring morning while looking for violets under the budding branches of gray old oaks, and beeches, and chestnuts, which had been standing for nearly a century.

A clump of wind-flowers, trembling on their frail stems, at the foot of a large oak tree, brought our whole May party rapturously on its knees before them, and, in that humble attitude, we descried a genuine Dryad before us! She was much smaller than the nymphs of old, it is true, and, with her delicate wings, might have been taken for a belated fairy, resting on the tree after last night's moonlit revel. Her form was slender, and she was as nut-brown as a wood nymph should be.

"That insect is a *Tremex*," said one of the party, who wore spectacles. "It is depositing its eggs in the tree."

Now it did seem preposterous that a fragile creature, hardly an inch and a half long, should make a nest in the hard oak wood; so we looked very closely, and somewhat doubtfully, to see on what grounds the spectacled one made such a statement. And, sure enough, the Tremex carried at the end of her body a piercer, about three inches long, with which to bore into the interior of the trunk; but how fine, how delicate! It looked like a hair. We laughed to think of such an instrument penetrating the wood, but the small creature, having crawled over the bark for awhile, sounding it here and there with her long weapon, selected a spot to her satisfaction. Then, arching her long body, she succeeded in placing the point of her piercer against the tree, and began to drill. She did not twist nor pound it in; she simply pushed, and by and by it was clear to all that the piercer was going in.

"See if you can do as much with a pin or a needle," said our spectacled friend; "just try how much force you would have to exert, and you may get some idea of the strength there is in that tiny body."

The piercer bent under the pressure exerted by the Tremex, but it was too strong to break. Now and then she withdrew it a little and thrust it back again. The process was slow, but we could see how it gradually disappeared in the tree, and forgot how the time was passing, in our interest. At last the piercer was completely buried in the wood.

"Now," said the owner of the spectacles, "she will place her eggs in the tree, and leave them there to hatch. Having seen how easily that delicate piercer enters the wood, you will not be surprised to hear that the soft grubs which will come out of the eggs are able to bore through it themselves, and in time will come to the surface, and change into large, winged insects, like the parent."

"But why does she stay on the tree now that her work is done?"

"Perhaps she can't get away. It sometimes happens that the piercer won't come out as easily as it goes in, and in that case the Tremex must die on the tree. Ah! she is freeing herself."

Indeed, the Tremex, as if she had heard these alarming remarks, and was resolved not to meet with such a melancholy fate, was squirming about energetically, and at last succeeded in withdrawing the piercer from the tree. Then she flitted away into the budding woods, brown little Dryad as she was. A tree had been her cradle and her dwelling-place, a tree was the home of her children, and among the trees she would die. Are there not as strange forest sprites in our woods as ever roamed through the ancient groves? In spite of learned books and scientific names, a Dryad is still a Dryad.

PUZZLE OF FAMOUS AMERICANS.

More Than Two Thousand Competitors—The Names of the Prize Winners.

The prize puzzle contest of "Seventy Famous Americans," which was announced in the February number of the AMERICAN AGRICULTURIST, has proved one of the most interesting and popular of any of our competitions. The result has been very gratifying in respect to the interest shown and the excellence of the lists submitted as answers.

Two thousand one hundred and ninety-two persons have entered the competition. Nearly one-fourth of the number succeeded in naming correctly all of the 70 famous individuals, but only 26 entirely perfect lists were received, the others having failed in the spelling of some name, or names, which caused their lists to rank below those which were entirely perfect. Below we give a *facsimile* of the list taking the first prize for accuracy, neatness and legibility.

By a slight misprint in the sentence containing No. 44, it was made to read as if the name were Ayers, instead of Ayer. This having puzzled some of the competitors, who could not tell whether the singular, plural or possessive, form was required, it was decided to be most fair to allow credit in this case to all who named the right person, whether they wrote the name Ayer, Ayers or Ayer's. None of the lists were thrown out on account of the spelling of that particular name. In the case of Nos. 27 and 28, the puzzle plainly and purposely called for the plural form of those names, therefore, only the plural form is allowed in those two words.

A few of the competitors raised the point that Captain Cook (No. 50) was not an American. It is true that he was an Englishman born, but a considerable part of his active life was spent on this continent, and he won honors on this side of the ocean. Accounts of his life will be found in the best books of American biography. Several of the famous men named in the list—the original Astor, James Redpath and some others—were not born in America, but their fame was won here, and they are catalogued in books of reference as Americans.

The number of competitors who found all the names correctly was so large that the decision had to rest upon very small points of accuracy. The larger number failed on the spelling of the name Holley, giving the spelling of the shrub "holly," instead of the inventor's name. Other errors which debarred many lists were the using of the letter e in Sedgwick, spelling the name Forrest with one r, giving the name of Thomas Paine as Payne, allowing but one t to the name Abbott, one l to the name Carroll and other similar slips. Some of the most beautifully-prepared lists lost the chance for a prize through a single slip of this kind.

Several hundred of the solvers had all but one name right; a number gave Bradstreet instead of Bradford, Graham in place of Pinkham, and one of the most beautifully-written lists of all had everything correct with the exception of writing Southwick instead of Southworth.

The most ingeniously-constructed answer was from Alfred Driggs of Connecticut, who arranged his replies in verse, in a most original and amusing way, though there were one or two errors, orthographical, which debarred his answer from the prize list. His effort is much appreciated, although the poem is too long to give entire.

After a careful examination of the 26 lists in which no errors could be found, it is decided that the following eight are best entitled to the prizes for their neatness of preparation.

THE PRIZE WINNERS.

First prize, W. J. Munroe, Lynnfield, Mass.

Second, John B. Grant, 108 Duane street, New York City.

Third, Robert L. Syler, P. O. Box 286, Ashtabula, Ohio.

Fourth, Mrs. Dr. St. John, Hackensack, N. J.

Fifth, Frances Evelyn Hill, Yorkville, Ill.

Sixth, Charles L. Hill, Box 128, Albert Lea, Minn.

Seventh, Charles W. Prescott, Concord, Mass.

Eighth, Charles W. Frazier, 5 Mall street, Lynn, Mass.

The other 18 persons who gave all the names correctly were Bertha L. Clark, Miss Hunnewell, Annie Louise Breckenridge, Mrs. Alice B. Anderson, G. W. Merrill, E. M. S. Warner, Mrs. Louise F. Chase, Willard H. Palmer, Daisy D. Layton, Hattie E. Weed, Mrs. M. P. Foster, Samuel D. May, Mrs. Clara F. Prescott, Ada E. Lewis, Lizzie H. Elliott, Angus Wright, Mrs. H. A. Prescott, Mrs. Hawthorne.

INTERESTING COMMENTS BY COMPETITORS.

This is one of the most interesting puzzles I have ever seen, and even if mine does not get one of the prizes, I have learned so much in looking up these names, that I shall not consider my time wasted. I hope that your next puzzle will be as interesting as this. L. D. BLACKWELL, Virginia.

I am an old man and do not expect to receive either of your prizes. Please accept my thanks for your puzzle of 70 famous names of celebrated Americans engaged, or have been, in nearly all branches and business of actual life. It is worth more than a year's subscription to your valuable paper to any person that desires to keep in memory the names and the life-record of noted Americans. It helps to strengthen the memory. It is the interchange of thoughts and sentiments of gifted minds; and the mingling of different characters, rightly viewed, will be productive of much good. J. M. LAWRENCE, Pennsylvania.

In looking over our AMERICAN AGRICULTURIST for February, 1892, my attention was attracted by your puzzle of 70 noted Americans of the past and present. Several of the characters carried me back to boyhood days in Salem, Mass. (50 years ago). Your numbers 29 and 31, always made the old Prescott house, then my father's, William Ives, editor and publisher of the *Observer*, their headquarters when lecturing there; and 38, I recollect him when he first brought out Charles Stratton, and carried him through the streets in a basket on his arm. It seems but yesterday that I saw 48. I attended No. 11's funeral in Marshfield, in 1852, and 17, if I mistake not, was born in Salem, but my recollection of him, personally, is indistinct. No. 45 was with us in early days, and 43 lived within five miles of us (Lynn), and 68 in Danvers. The other characters are all familiar, with but two exceptions, 26 and 55, but I have been in the woods some 31 years, and it is not to be expected for me to keep up with the procession of celebrities. I have not a "Webster" in my possession, but below is my hand at the list, and if I don't get the "Jack-knife," I'll not mourn.

WILLIAM HALE IVES, Illinois.

(W. J. Munroe
Lynnfield, Mass.)

Seventy Noted Americans

1 Washington	25 Field	49 Noah Webster
2 Franklin	26 Holley	50 Cook
3 Longfellow	27 Singers	51 Mayne Reid
4 Paul Revere	28 Weeds	52 Sedgwick
5 Penn	29 Garrison	53 Stowe
6 Key	30 Lovejoy	54 Shuld
7 Daniel Boone	31 May	55 Warner
8 Burr	32 Grant	56 Southworth
9 Paine	33 Lee	57 Lamb
10 Bradford	34 Forrest	58 Blackwell
11 Daniel Webster	35 Booth	59 Downes
12 Cooper	36 Carroll	60 West
13 Cable	37 Bergh	61 Redpath
14 Jackson	38 Barnum	62 Tyler
15 Taylor	39 Cartwright	63 Cleveland
16 Colburn	40 Harper	64 Arthur
17 Bancroft	41 Appleton	65 Pierce
18 Jay	42 Hood	66 Madison
19 Fillmore	43 Pinkham	67 Porter
20 Astor	44 Ayers	68 Peabody
21 Clay	45 Butler	69 Peter Coopers
22 Kane	46 Abbott	70 Lincoln
23 Hayes	47 Webb	
24 Morse	48 Hawthorne	

FACSIMILE OF THE LIST WHICH TAKES FIRST PRIZE FOR ACCURACY, NEATNESS AND LEGIBILITY.

THE MAY PUZZLES.

For the best five lists of answers to the puzzle below we will give these prizes:

For the neatest and most correct copy a World Typewriter worth $8.00.

For the next most complete list a Remington Double-action Flobert Rifle worth $4.00.

For the third most complete list an AMERICAN AGRICULTURIST telescope worth $3.00.

For the fourth most complete list a Florence Plush Toilet Set worth $2.00.

For the fifth most complete list an AMERICAN AGRICULTURIST microscope, worth $1.00.

13.—GEOGRAPHICAL PUZZLE.

Write out the whole story, supplying words that make good sense instead of the geographical words in the parentheses.

Last summer I took a vacation, and as I am very fond of (town in Wisconsin) I took along my (town in Mississippi) and (river in Montana). When I arrived at my destination, I found my friend (county in Indiana, river in South Carolina) waiting for me at the station. He had brought me a (town in Maryland), but had neglected to procure me a (town in Oregon). I told him I must have one, but he said that after I became a good (town in Maryland) I would be glad I did not have one. The first night I was there I (town in Missouri) a big (river in Maine), which made me quite happy, as I had never seen one before. The next morning I went out to (river in Maine), and the first thing I saw as I neared the (town in Maine) was a lot of (lake in Maine and lake in Wisconsin). We had very good luck and carried home over 100 pounds for our forenoon's work.

In the afternoon, I was introduced to Miss (town in West Virginia, town in New York) who was a very bright and well-educated young lady. After a few commonplace remarks, she asked me if I was a good (town in Virginia). I replied that I was not a professional, but sometimes amused myself a little in that line. She said she played the (town in Louisiana) and would accompany me, if I liked. My selection was (town in Kentucky), but I had hardly started when she stopped playing and said my voice sounded like a (town in Kentucky). I am not very sensitive, but her remark made me (river in Vermont), and I retaliated by saying she was dreadful (mountain in Vermont), and did not know a (lake in Minnesota) from a (island in New Jersey). This made her so provoked that she sent for her (town in Texas), who made matters right by saying we both needed a (town in New York). The next morning when I met (town in Michigan), she was as (town in South Carolina) as could be, and when I left for home that afternoon she gave me a (town in Alabama), and in return I asked her if she would not (town in Florida), which she did, and I went away feeling that I had had a very pleasant vacation. As we passed out of town I had a very (town in Wisconsin) of the place, and even now my memory dwells with (town in Maryland) upon the (town in Alabama), where I found such (town in Maryland) and where I formed such a (town in Alabama) with the before mentioned young lady, that she is now my wife, a fact which I have never regretted to this day, and never expect to.

The Fruitful Valley of the Santa Clara.

Whoever has paid a visit to the Golden State and had the leisure to explore its wonders, must have been charmed by the appearance of this—one of Nature's most luxurious beds. For of all natural gardens with man's assistance, surely few, if any, reach a state of perfection which is here to be found. Semi-tropical vegetation clothes the earth with rich profusion, and the balmy air completes that sense of subdued delight which the vision had primarily originated. With a temperature that rarely falls below 50°, fruits of all varieties grow abundantly, and, sheltered by the foothills of the Santa Cruz Mountains, are orange and almond groves, vineyards, cherry, peach, apricot, prune, apple and pear orchards. Melons also thrive well; and lately a suggestion for the cultivation of the coffee berry on the gentle slopes of the mountains has been receiving attention. San José is the center of this vast fruit region. A drive from this town in the direction of Los Gatos, takes one through a lovely stretch of country. Immense orchards and vineyards, symmetrically arranged meet the eye on either hand, while stately residences in their midst attest to the prosperity emanating from the cultivation of the fruit, which, generally speaking, is collected during the months of June, July and August, and, when not shipped direct for immediate consumption, is sent to the canneries in the vicinity, and sold for export. During August and September the great majority of grape pickers find employment on the ranches, whose output is usually dispatched to one or other of the wineries in the neighborhood. On one of the spurs of the Santa Cruz Mountains, just outside Los Gatos, stands the solid stone building, erected by the Jesuit Fathers for the training of young students. These latter have the management of a fine orange grove and vineyard, which are always kept in splendid order.

To climb one of the hills and survey the beautiful vale—which could happily suggest a basis for another Garden of Eden—is a pleasure not to be missed. On clear days, San Francisco, a distance of fifty-six miles away, can be easily seen, with its forests of masts fringing the water front, and the rival town of Oakland, to which ferryboats are constantly plying from the city of the Golden Gate. The price of land is very high, but of course is regulated by the position, water facilities, improvements, etc., but a well-stocked fruit ranch always brings over $1,000 an acre, and there are few owners who desire to sell out. The country roads are good, and render traveling an easy matter. A branch of the Southern Pacific Railway runs through the valley and carries away its products to the seaports, or transports them to the Eastern market. EDMUND PARKER, Santa Clara, Cal.

The Pyrenean Shepherd's Dogs.

Noble dogs! Canine giants! Each shepherd, with the aid of these powerful and fearless dogs, tends from 2,000 to 4,000 sheep. Each dog cares for 400 sheep during the entire summer season in their marches up and down the Pyrenees. Nightly, the flocks are exposed to the ravages of hungry wolves, but with the united efforts of the shepherds, dogs and donkeys, which the shepherds use, the wolves are kept at bay. The day's journey, ascending, does not average 10 miles per day. These dogs are among the most intelligent of their race. They become strongly attached to persons and places when kept upon farms or about the premises as watch dogs. They are kind to the sheep and lambs of the flock, as well as being most affectionate companions and defenders of the shepherds.

This migration of flocks from the plains to the mountain pastures in summer, is one of the ancient customs of Spain, France and Italy. The caravan is composed of men, sheep, donkeys, goats and dogs. The donkeys carry the provisions, and the goats supply the milk. The whole system is conducted with the regularity and strictness of the march of an army. The under-shepherds collect their flocks every evening as closely as possible, and report to the chief shepherd their condition. This journey requires about a month. The entire expense per head of sheep for the season varies from 20 to 35 cents, and singular to state, the death rate does not reach five per cent. of the flocks. But the trifling profit to the owners of the pastures does not yield a tithe of what the land would bring under cultivation. The shepherds bivouac under the broad canopy of heaven in the cold mountain air during the season. In every part of France, the Bull-dog, Greyhound, Poodle and Fox Terrier are kept by lovers of the canine race. Frenchmen, with the most modest hunting proclivities, keep Setters and Pointers. H. ERICUS, Paris, France.

Reclaimed Swamp Lands of Illinois.

There are vast tracts of land in all these parts of the State which were known in the early times as "swamp lands," and as much of these lands was too wet for survey, they were given to the several counties in which they were located. But by a system of drainage, assisted by natural causes, nearly all of these lands have become tenable for grazing and tilling, and when tilled under favorable circumstances, the crops are immense. A large tract of this land is found in Whiteside and Rock Island counties, known as the "old Mississippi bottom." It will average about three miles in width and is from 40 to 50 miles in length. It is one vast prairie over which, but a short decade since, the annual prairie fire swept in all its grandeur and destructive terror, consuming hay enough, if properly harvested, to supply one of the New England States the year through. A celery farm has been started near here, and the quantity and quality produced will warrant the most sanguine expectations. Three iron bridges are to be built across Rock river in this county during the coming season, and the old ferryboats will lay down their weary burdens and float unheeded down the river of time, and soon the story of the ferry will be as incredible as is now the fording of the early emigrant.

Many of the farmers here have adopted the Eastern plan of cutting up their corn, thus greatly increasing their facilities for carrying more stock. Much of this corn is fed from the shock, but a combined husker and cutter has been invented, and is being extensively used, which is a success, and is giving great impetus to this new departure. In fact, nearly everything here in the farming line is done by horse power and machinery. Grain is sown, harvested, bound and threshed by machinery. Corn is planted, tended, husked, shelled and ground by machinery. Hay is cut, tedded, loaded, stacked and mowed by machinery. Potatoes are planted, tended, dug and sorted by machinery, and on some of the farms the washing and churning are done by power, but the cooking, ironing and dish washing still linger in the same old ruts. More farms are rented than are improved by owners. One great cause of this is the difficulty in getting help both indoors and out. Most of these renters are Germans and Swedes, and in general are regular hustlers, and they have to be, or rent-day will find them in the limbos. But this is rarely the case, on the contrary, they stand ready with "yaw, I take him," whenever a farm is offered for sale. SETH JONES, Whiteside Co., Ill.

Prune Culture in Oregon.

The best land for prune culture is a rich loam or alluvial river bottom. Overflow from the river or mountain streams does not injure the trees, provided it does not cover the land for too long a period. The best situation is on the edge of a piece of timber that protects the trees from westerly winds. Close proximity to rail transportation is of the utmost importance in the proper handling of the dried product. Preparatory to planting, the land should be summer-fallowed—plowing frequently the season before the intended planting, in order to thoroughly pulverize the soil and facilitate the work of planting the trees, which should be done before the autumnal rains set in. Too much stress cannot be laid upon the proper planting of the trees. Every advantage should be given to get a proper start, avoiding the exposure of the trees to the atmosphere which would dry out the roots or the fibrous portions. In this the failure to grow will be merely nominal.

No crops should be harvested upon the land after the planting of the trees. The land should be cultivated and kept free from weeds until July, after which time the soil should not be disturbed until the leaves begin to fall in October, when the whole orchard should be plowed and harrowed down, throwing the earth toward the trees for the winter, and the other way in the spring, giving sunny exposure.

At four years old—and they should not be permitted to bear before—a reasonable crop may be expected, about 20 pounds of dried fruit to the tree, and at six years a yield of not less than 50 pounds of dried fruit with each 108 trees, or 5,400 pounds per acre, worth from 7 to 12 cents, or about an average of nine cents per pound, wholesale, upon which an expense, not to exceed three and one-half cents has been incurred in the production, including cultivating, picking, packing, labels, interest on capital and transportation. A great amount of skill is not so requisite as is ordinary intelligence. Pests, hitherto, have not interfered with the tree nor its fruit; immunity, however, must not be expected. Prune culture is a nice, clean and profitable business, which is constantly increasing in dimensions and importance.
W. T. RADIR, Willamette Valley, Oregon.

Bush Farming and Sheep Raising in New Zealand.

Our new ministry are making it a cardinal policy to throw open Crown Lands, and bush farming has made proportionate strides. In the earlier days of settlement the open land was the only land considered fit for use, but the success of those who first tackled the work has conclusively proved that more is to be made from cheap bush land than the more costly open land. Thousands of acres are being felled and, as all this land will carry two sheep to the acre the whole year round, the district is making rapid strides.

Some of our farmers are making experiments in the way of establishing cross-bred sheep. The Merino ram with the Lincoln ewe is claimed to be the best for early maturity, fitness for freezing and fine wool. One farmer gave me the following result of a trial, viz.: That he had turned 160 each of cross-bred wether Hoggets and pure Lincoln wether Hoggets into the same paddock from the time they were weaned in February, to November (shearing time). He lost five per cent. of the pure-breds, not one of the cross-breds. He got two cents per pound more for the cross-bred wool and sold the cross-bred wethers for a shilling per head more. Whether the breed can be established as a permanent variety remains to be seen. Judicious culling will no doubt help this, but many think it will be necessary to resort back to the pure-breds on both sides from time to time. There is no doubt that if we had a few of our American friends among us, fruit producing would become a great industry. We have yet a good deal to learn in Wanganui. ED. N. LIFFITON, New Zealand.

Western North Carolina.

An article in the AMERICAN AGRICULTURIST five years ago, influenced me to locate here. There is much to influence others in the North to make the same move. As was then said, the State is well wooded, well watered, more different kinds of crops grow than in any other State, and one can pick a climate from southeast to northwest to suit himself. There is here a spontaneous growth of crab grass yearly, which, on soil in good condition, makes heavy growth. This grass grows, on such land, three feet high. Lateral branches grow out at the joints. The stem is small, and is eaten with avidity by stock in general, and is unlike the larger and more woody stems of rank herdsgrass and clover. It is this grass in crops that requires so much labor in the South to keep subdued, when not taken in season. If you want a perfect forage crop of this roughness, you need only harrow in twelve bushels of cowpeas to the acre. The stems of the peas are large, and difficult to cure by themselves, but when cut and cured with the crab grass, all comes out bright. This is the cheapest forage crop known to the writer.

Corn is the sure crop; sweet potatoes and goobers (peanuts) grow almost without cultivation. All these are fattening, so that beef can be made. I have just slaughtered a cow which weighed (the meat alone) 720 pounds. Best steaks sell for eight cents. The selling price on foot is five cents per pound for the meat. One bushel of corn, at 75 cents, can be exchanged for five bushels of cotton seed, at 15 cents; these will help make milk and beef. They did so on that big cow. Cotton-seed hulls are sold at 15 cents per 100 pounds at the mills. In connection with the oil mills are herds of cattle being fattened on cotton-seed meal and these hulls for roughness. There are, at this place,

five cotton mills. These consume 20 times as much cotton as is raised in the surrounding country, thus giving farmers a quick market, at the top New York prices. Cotton is the money crop, but other crops can be turned to advantage. Little interest is taken in fruit, yet it thrives evidently, as can be seen by the rapid growth on apple, pear, peach, and plum trees. Those intending to come here should get all information possible, prospect well, and then depend on themselves.

BENJAMIN F. PIERCE, Gaston Co., N. C.

The Situation and Climate of Victoria.

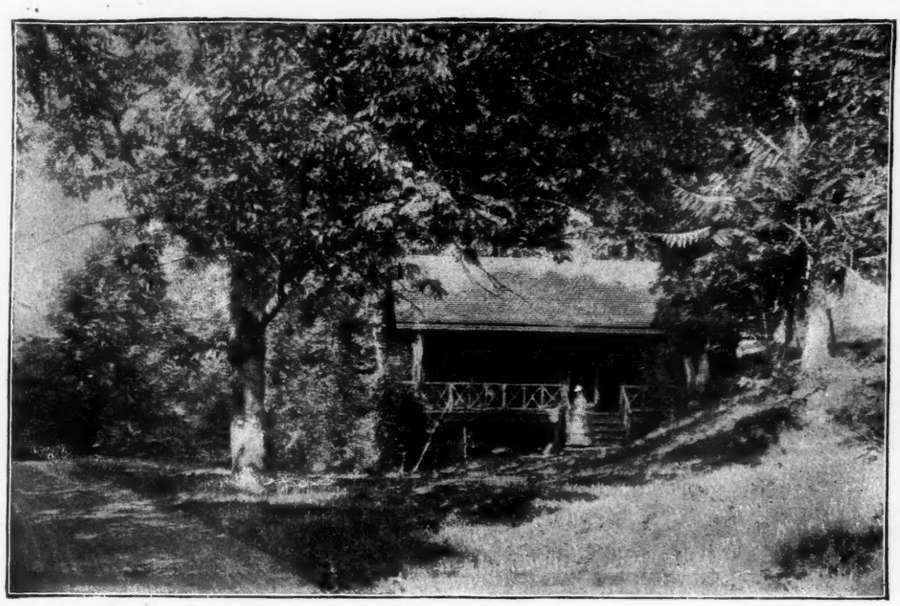
The colony of Victoria occupies the southeastern portion of, and is the southernmost colony on the Australian continent. It lies between the 34th and 39th parallels of south latitude and the 141st and 150th meridians of east longitude. It is bounded on the north and northeast by the colony of New South Wales, on the west by the colony of South Australia, on the southeast by the Pacific Ocean, and on the south by the Southern Ocean. Its extreme length from east to west is about 420 miles; its greatest breadth about 250, and its extent of coast line nearly 600 geographical miles. The area of Victoria is 87,884 square miles, or 56,245,760 acres, being about one 34th part of the whole continent of Australia. Although the least of the Australian colonies Victoria has a population of 1,148,003, being 40 per cent. of the population of all Australia.

The climate of Victoria, from its geographical position, is more temperate than that of other parts of the continent of Australia, the annual mean temperature being nearly 58.0 against 49.4 in England. Upon the average, on four days during the year the thermometer rises above 100 in the shade, and generally about three nights during the year it falls below the freezing point. There is no winter in the American sense of the word, it is merely a season in which there is more rain and less heat than in summer. The eastern coast range of the Australian continent terminates in the Gippsland district. From this a spur, called the Great Dividing Range strikes off westward and extends across the colony of Victoria. This dividing range divides the colony into two divisions, the northern and southern, or if we include the whole course of the mountain chain, we have the colony divided into the inland and coast districts. Roughly speaking the country on the coast side of the mountains averages a little over 100 miles wide, and the inland district, from the mountains to the river Murray, averages about the same. The coast districts of the colony enjoy a copious rainfall. The rainfall of Melbourne has averaged for twenty years 25.44 inches. In this district wheat, oats and barley are cultivated, English grasses laid down, good crops of potatoes obtained, and such roots as turnips, mangels and beets, grown. In the northern or inland districts the average rainfall is generally below 20 inches, and some specially dry localities do not average more than 10 inches. In the moist sections of this district where the annual rainfall will average from 12 to 18 inches, oats, barley and wheat are cultivated satisfactorily, but root crops rarely succeed. In the drier sections with a rainfall not exceeding 12 inches the wheat crop is the only one that can be depended upon to yield a fair return. The largest number of Victorian farmers are settled in these inland districts. There is scarcely any timber in the dry districts. Trees enough, grow in patches or belts to provide fencing timber, but the great proportion of the area is open plain land ready for the plow. This land is more fertile and as easily tilled as the prairies of America. In the dry districts the natural pastures are excellent, and as the climate is warm, stock thrives well. Throughout the colony stock are neither housed nor fed in winter. The Merino sheep run all winter without shelter; cattle in the same way are kept out on pastures and fattened for the butcher; dairy cows are kept milking without being housed or fed, and horses not at work spend the winter in the open fields. As an indication of the advantage we possess in climate, it may be noted that our native trees are evergreen, not casting their leaves in the winter.

D. E. MARTIN, Secretary for Agriculture,
Victoria, Australia.

A Pretty Dairy Cottage

In line with such farm improvements as the AMERICAN AGRICULTURIST always advocates, is the tasteful dairy cottage on the farm of E. P. Stillman, Cornwall, N. Y., near Storm King mountain. Although attractive and pleasing in appearance, suggesting a Swiss chalet, it is built for use and convenience, and has answered its purpose well for a number of years, although so pleasing is the situation and picturesque the building that strangers, passing by, suppose it to be a dwelling built for looks alone. A cold spring flows out of the hillside underneath it, and determined the location. The basement, built of the natural stone found scattered about, is the dairy, and has a cool, even temperature. The other part, built of wood with a shingle roof, makes the cottage. The chimney is of rough stone, and the balustrade and railing of red cedar, with the bark left on as it was cut from the near hillside. The wide, projecting eaves make a good shelter to the piazza, and render the rooms as cool as possible during the hot days, when the sun beats down with great power in this sheltered valley, and sheds the mountain showers that are sometimes violent. Some of the best butter made in Orange county comes from here. [The accompanying illustration, engraved after a photograph taken for the AMERICAN AGRICULTURIST, presents a pleasing picture of this attractive structure.]



A PRETTY DAIRY COTTAGE.

JOHN DE WOLF, Orange Co., N. Y.

Montana Fruits.

Fruit growing in this State, is as yet in an experimental stage, at least so far as the larger fruits are concerned. The small fruits, such as currants, blackberries, raspberries, strawberries, etc., can be grown in great perfection, and are remarkably prolific. An orchard of some 200 trees on the "Austin Place," is situated on the Missouri River, just at the beginning of the mountain foothills, which protect it from the morning sun, until eight or nine o'clock. It includes a number of varieties of apples, such as the Whitney, Wealthy, Oldenburg and Red Astrakhan, as well as the Transcendent and Hyslop crabs. The trees have been planted for about ten years, but the past season was the first in which they matured a crop large enough to ship any distance away to market. The larger varieties of apples ranked with the best summer apples grown anywhere, and the crab trees were loaded down with excellent fruit. Such a crop will do much towards stimulating others to plant fruit trees in this State.

ROBERT S. WILLIAMS, Casade Co., Montana.

Sulphur Spring Valley, Arizona.

This valley is in Cochise county, the southeast corner of Arizona. It stretches a hundred miles northward from the Mexican boundary, with a width of twenty-five to forty miles. On the east are the lofty, well-timbered Chiracahua mountains, on the west the Dragoon range, to the north is the Dos Cabezos (twin heads) towering 3,500 feet above the plain, and 8,000 feet above sea level, and to the south is the boundless view into the Mexican State of Sonora. The leading industry here is livestock raising. The surface is smooth, and was originally covered by a rank growth of nutritious grasses, which has been kept down of late years by close grazing.

Herds started from Mexican cattle and improved by good bulls, are the hardiest stock. They do well on the coarse mountain grass, if hunger forces them from the valleys, and, unlike higher bred animals, they do not get foot-sore. Within the last few years full-blooded Hereford bulls have become the favorites with stockmen. They are active, and keep in good condition on meager herbage. The "calf crop" has increased since its introduction, and early maturity seems to characterize the grades. It is fortunate that a good demand exists now for 'feeding" steers, whole train loads being shipped for Northern buyers. Only in a few places in the foothills do the ranchmen have running streams. They mainly depend on wells and windmills, with an occasional steam pump. Troughs are usually provided, though at times the stock are seen knee-deep in polluted water which they would not touch except from necessity. There is only one flock of sheep in Sulphur Spring valley. They average about sixty pounds dressed, but are being improved from Californian rams. They have increased to about 5,000, and as wethers sell to the butchers at four dollars a head they have paid well. They are on very poor pasturage now.

We have a good horse-breeding country. In the valleys horses are liable to loss at times from Mexican thieves, but in the mountains they are generally safe. Such a thing as a horse dying of starvation is unknown. They can go long distances to water, and hunt on rocky steeps for dwarf nutritive grasses where cattle are helpless. The month's wages of stock herders is $30 to $35 exclusive of board.

In the valleys 4,000 to 5,000 feet above sea level the summer heat is from 90° to 93°, with a few days when 100° to 104° is reached, but owing to the dryness of the atmosphere, 93° in the shade, is not nearly as oppressive as 75° is in Illinois. In winter the thickest ice in water troughs never exceeds two inches, and it only lasts two or three nights. The snow-fall, ranging from two inches in the valleys, to two feet on the mountains, melts in a few days. We have not over fifteen days in the year when out-of-door work is interrupted.

What the future of our cattle interests is to be, is hard to determine now. The fact that great numbers of female calves are being spayed, and young steers are being sold, is proof that a reduction in numbers is considered advisable.

JOHN DARE EMERSLEY, Dos Cabezos, Arizona.

FARMING IN FOREIGN LANDS.

A dairy show is to be held at Hamburg, Germany, in 1894.

The ibis is being used to advantage as a destroyer of locusts, near Melbourne.

In Queensland efforts are being made to cultivate coffee, cotton, and rice.

Grapes at Brisbane, Queensland, bring very low prices, and are not a paying crop.

Rain-making experiments, conducted in India, have resulted in complete failure.

No grain of any kind can be shipped from Russia till after the harvesting of the next crop.

There is a scarcity of clover and grass seeds in England, the United States, and New Zealand.

New Zealand exported, in 1891, butter to the value of $750,000, and cheese to the value of $435,000.

Farmers in the New England district of Australia are about to turn their attention to grape growing.

The area planted to hops in England was 56,145 acres in 1891, as compared with 54,555 acres in 1890.

In South Africa the seller of any horse or ox is bound by law to provide two sureties that it was not stolen.

Owing to rust in wheat, Cape Colony has recently been compelled to import breadstuffs largely from Australia.

A disease, resembling diphtheria, broke out at Geelong, Victoria, killing over one hundred hogs within two weeks.

The area planted to apples in Tasmania is 9,808 acres, against 6,459 acres in 1881, and is being rapidly increased.

Good apricots are being grown in New South Wales. The crop is not large, but the flavor of the fruit is excellent.

Hawaiian planters feel the loss of the United States bounty on their sugar, which they received for so many years.

Queenslanders ask where a market is to be found for the fat bullocks coming off their rich pastures in tens of thousands.

A London fruit broker will visit New Zealand to give information regarding the treatment and packing of fruit for export.

The bark of the Australian Mimosa is now used as tannin for hides to make morocco leather, as it gives a slightly reddish tint.

The world's production of barley is 825,000,000 bushels, Europe contributing 640,000,000 and the United States 60,000,000 bushels.

In Nicaragua there are 28,000 acres planted to coffee, producing 14,000,000 pounds yearly, the bulk of which is exported to Europe.

Many settlers at Nueva Plata in the Argentine republic are planting trees, which, they believe, will pay better than corn or wheat.

Queensland statistics for 1891 give exports of wool 32,134,794 pounds, valued at $6,341,960; of meat 14,574,943 pounds, valued at $1,102,030.

In the Southern and Eastern districts of Cape Colony horse sickness is killing numbers of stock, 200 dying recently in one small district.

Exports from New Zealand of agricultural produce, wool, flax, frozen and preserved meat, declined largely toward the close of last year.

Experiments toward rust prevention are being made in all the colonies, and a conference was held in Adelaide, in March, to report results.

Australasia has 50,000,000 acres of forest, yet imports, annually, lumber to the value of $15,000,000, chiefly from the Pacific Coast of the United States.

The cultivated area of Egypt is about 5,250,000 acres. The number of sheep is 1,050,000, and the exports of wool about 8,400 bales, of 400 pounds each.

In Canada there are 2,228,347 acres devoted to stock raising. In the districts of Alberta and Assiniboia there are 117,659 cattle, 16,519 horses, and 44,762 sheep.

In the Southern part of Queensland grass is scarce, water is drying up, and there are indications of drouth, but in the northern section heavy rains have fallen.

Wood-glucose bread is used in Germany as feed for cattle. The cellulose is transformed into grape sugar, and added to it is about 40 per cent. of meal of wheat, oats, or rye.

The principal wheat exporting countries of the world are in the order named: the United States, British India, Austria-Hungary, Russia, Australasia and the Argentine.

Prince Edward Island grows very good wheat, and probably better oats than most parts of the Dominion. The island is also noted for its large crops of excellent potatoes.

The New South Wales government has prohibited the importation of any stock from California till January 15, 1893, owing to the existence of glanders on the Pacific Coast.

In South Australia there were 2,649,000 acres cultivated in 1890-91, of which 1,673,573 acres were in wheat, and 345,160 acres in hay, leaving but 630,365 acres for all other crops.

To enable the continuance of the Queensland sugar industry it has been found imperative that cheap Polynesian labor be introduced from the South Sea Islands.

Owing to reports of distress in India, the famine code has been applied to a section of 5,000 square miles with a population of 1,500,000 people. This does not include the wheat belt.

The dairy produce of New Zealand was: 16,310,012 pounds of butter and 6,975,698 pounds of cheese in 1891, as compared with 12,170,964 pounds of butter and 4,594,795 pounds of cheese in 1890.

In India there are 330,000 acres under tea cultivation, only 10,000 acres of which are within the tropics, the remainder being in Northern India. There are 260,000 acres planted to tea in Ceylon.

Colonial butter is now beating that of Normandy in the English market, the reason being that the colonial produce is all pure grass butter, while the continental and English products are from fodder-fed cows.

Canada has exported 316,464 horses since the confederation, and, of this total, 305,479 were shipped to the United States. The imports during the same period were 38,760 head, chiefly for stud purposes.

The sponge industry of the Bahama Islands employs 500 boats and nearly 5,000 men. A similar industry is being developed on the coast of Florida, where the sponges are finer than at the Bahamas.

Reciprocity is extending to the colonies. The proposal is made that Tasmanian hops and timber should be admitted free to South Australia, in return for South Australian wines being admitted free to Tasmania.

The area in New Zealand just cropped for wheat was 3,720,000 acres, and the yield is placed at 38,005,000 bushels. The local demand for consumption and seed is 26,000,000 bushels, leaving 12,000,000 bushels for export.

Experiments in Germany show that peat is a good material in which to store potatoes, turnips, onions and other similar vegetables. Potatoes, after eight months, were found in perfect condition without ever having germinated.

Cigar-tobacco growing and manufacturing has made marked progress in India within the past 10 years, and now excellent brands of her choice tobaccos are known throughout the world's markets, except in the United States.

The first lot of apples shipped from Tasmania arrived in London last month. These aggregate shipments will amount to 240,000 bushels in 12 separate consignments. The fruit is packed in cool chambers during the voyage.

Several Australian ranchmen, or pastoralists, have incomes ranging from $50,000 to $500,000 per annum. One man, who owns nearly 30 stations or ranches in Victoria, Queensland and New South Wales, had a net profit of $910,000 in 1890.

A syndicate has been formed in Sydney, and an agent dispatched to England, to open up and permanently establish a market for Australian horses. America, being so much nearer, should be able to compete successfully in the English market.

Other new varieties of French potatoes are the Aspasia of vigorous growth with large, flat, red tubers, and a late ripener; the Whitehorn, with long, yellow tubers of delicate flavor; and the Roussette, a round, reddish, rough-skinned potato, medium early.

The banana yields a larger supply of food for man than any other plant on a similar extent of ground. The fruit of an ordinary banana tree averages from thirty-five to forty pounds weight in a season. When ripe, the banana consists of 74 per cent. of water, 20 per cent. of sugar, two per cent. of gluten, and the remainder of mineral matter and woody fiber.

The average weight of fat steers at the age of five years, in the London and Liverpool markets in 1706 was 310 pounds. In 1755 it had increased to 482 pounds, and in 1830 to 650 pounds, while to-day the average weight is 1,250 pounds, four times what it was 184 years ago.

The Austrian congress of viticulturists disadvises the planting of the so-called direct producing American vines, and recommends the use of grafted American vines. The importation of *Vitis riparia*, *rupestris*, and *Solonis* is again made free of duty by the Austrian government.

At Berlin, in 1891, there were 1,084,826 animals slaughtered, as compared with 1,142,750 in 1890. Nearly 4,000 animals were seized as unfit for food, and, while there was a decrease in the consumption of beef, mutton and veal, there was an increase of 30,000 in the number of hogs killed.

The wheat crop of New South Wales yielded 13 bushels per acre, rather less than the average of the past 30 years. The total area cropped was 318,265 acres, as against 333,233 last year. Requirements are 7,250,000 bushels, exclusive of seed, consequently, over 3,000,000 bushels must be imported.

A small lot of South African peaches were sold by auction in the London market in January at prices averaging 50 cents each. They had been carefully and thickly wrapped in cotton wool, and had as fine a bloom as if fresh picked—a hint for those who wish to pack fancy peaches for a fancy market.

After the short American potato crop of 1890, there were shipped to the United States from abroad 5,363,707 bushels in 1891, of which Canada and her dependencies shipped 3,947,816 bushels, Great Britain and Ireland 1,303,600, British West Indies 76,376, Germany 41,839, and Cuba 22,348 bushels.

Canada exports annually, 15,000 tons, and the United States 23,000 tons of cheese, equal in quality to the Gruyere cheese of France. This, together with the Swiss cheese, competes with that of French make to such an extent as to create suffering among French cheese makers, who wish legislation for putting a stop to, or limiting the profits of merchant and middleman.

Sales of real estate in Great Britain show a falling off in value in England, for 1891 as compared with 1890, of $10 per acre, the total sales for 1891 being 49,600 acres, at an average value of $215 per acre. In Scotland the sales were 98,457 acres, at an average of $20 per acre, and in Wales, 8,663 acres, at $95 per acre. There was an increase in the price per acre, over 1890, in both Scotland and Wales.

A new evaporating apparatus for sugar beet juices is attracting attention in Germany. The temperature and pressure are uniform throughout each compartment. Juices are introduced from the top upon tubes which are not hermetically closed. The concentrated juice that falls to the bottom is drawn off by pumps, and the juices are not allowed to remain at the bottom of a compartment.

In France it is found that the aroma of wine made from grapes of the same species, but grown in different districts, is quite distinct. The characteristic bouquet is due to the soil, and wine from vines or cuttings that have been removed does not, necessarily, possess the special flavor of the original when planted in other districts. The best wines are produced from grapes grown on volcanic soils.

In Germany, barrels and tubs are now being made in a single piece by a new system of cutting logs into boards and veneers. The log is steamed and softened, then placed in a machine and rotated against a knife which shaves off a continuous veneer, or board, till the log is consumed. In making barrels, a strip is notched in each edge, and then it can be rolled into cylindrical form, ready for hoops and heads.

Notwithstanding the rich pasture lands of England, and the fact that she consumes more butter than any other country in the world, dairy farming there has been declining. The English consumption of butter is 13 pounds per head per annum, as compared with eight pounds in Germany, six pounds in Holland, four pounds in France and one pound in Italy. England paid away $50,000,000 for foreign butter in 1891, and $20,000,000 for oleomargarine.

SCIENCE IN FARMING.

CROSSED VARIETIES OF CORN.—For three years experiments with crossing different varieties of corn have been carried on at the Kansas experiment station (Kansas No. 27, pages 20), with a view to learning whether types of corn can be blended; also to learn whether the cross so formed will retain its character. The results seem to justify the conclusion that the characters of so-called distinct varieties of corn may be made to blend more or less completely. This shows that desirable forms may generally be secured at will, provided the characteristics sought, exist in the varieties used in crossing. The experiments further indicate that the blended form, or cross, if not contaminated by foreign pollen will not revert to the original types. These two conclusions seem to show that corn, by judicious selection, may be bred up with good success, and results obtained similar to those which have led to the establishment of the improved breeds of domestic animals.

EXPERIMENTS WITH SPRING GRAINS.—One hundred and forty varieties of spring grains were grown side by side at the Ontario Agricultural College for three years. (Bulletin 71, pages 8). These comprised foreign and native grains grown under similar conditions, and comparisons were made relative to the yield per acre, weight of grain per bushel, weight of straw per acre and also the date of maturing. In addition, the color of the grain and the peculiarities of the growth were considered, with the assistance of the flour and oatmeal millers, respecting their comparative values for milling purposes. These results, which will be valuable in localities having a similar soil and climatic conditions, showed that, in general terms, barley, spring-wheat and oats yield well in proportion to the earliness of the date at which they are sown, but the two latter may be sown in exceptional seasons, too early to obtain the very best results. They are also all likely to weigh well in proportion to the earliness of the date at which they are sold. Higher yields may be expected from some of the foreign varieties of spring wheat than from those commonly grown heretofore. Of all the foreign varieties yet introduced there, Pringle's Champion has been placed first for milling purposes. Of the barleys considerably higher yields may be expected from several of the foreign varieties, than from the Ontario six-rowed, particularly the Manshury from Russia, the Chevalier from France and the Empress from England. The same holds true of oats, of which the Joanette Black from France stood the highest in point of yield.

A NEW EXPERIMENT STATION.—Washington's new experiment station has recently issued two Bulletins. In Bulletin No. 1 (pages 18), special attention is given to the horticultural interests of the State. Besides the acts creating the State board of horticulture, descriptions of and remedies for the more common insect pests, as the hop louse or fly (*Aphis humuli*), codlin moth, apple tree caterpillar, etc., are given. (Bulletin No. 2. pages 18) continues this subject. These bulletins are of considerable value to Pacific coast horticulturists, but the subject has been treated many times before by those of other sections. This station promises to do valuable work for that section.

IRRIGATED FARMING.—The Wyoming Experiment Station has six experiment farms to test the various altitudes and climates of that State. The Central Station at Laramie directs all the experiments and does all the laboratory and office work. During last year (Report, 1891) the Station tested varieties at altitudes from 4,000 to 8,000 feet above sea level, with mean summer temperature from 55° to 65° F. Except in the Black Hills region, all crops were irrigated by various methods, furrow irrigation proving best. Experiments were begun with chemicals to retain the soil-moisture, to preserve fence posts and to counteract alkali. Many of the soils, irrigation waters and native grasses of Wyoming were analyzed by the chemist. Twenty varieties of grasses and forage plants were tried without irrigation. Alfalfa and English rye grass best withstood the drouth and cold. The effect of altitude and irrigation upon sugar beets, showed that the cold, dry fall (mean temperature, 50° F.) produced a high sugar content. The work of one of these institutions in a section like Wyoming is quite different from that of the stations in the older States where agricultural conditions are well known. The AMERICAN AGRICULTURIST believes that the experiment stations in the newer States of the West are destined to do a work of far more direct and immediate value to the farmers of those regions that can be expected in the East where the scientific work, with its slowness of result, is necessarily so prominent.

DEWBERRIES.—Like blackberries and raspberries, dewberries bear their fruit upon canes of last year's growth, which die after fruiting. They are propagated by means of tips and root cuttings. This fruit is early, large and attractive while the plants are easily protected in winter. On the other hand, the flowers sometimes fail to set, and nubbins form, while the fruit is hard to pick. This last may be overcome by training the plants on racks or trellises and keeping well pruned. Several methods of cultivation are advised. But the plants do best when set at about the same distance as blackberries, three by seven feet or four by seven feet, and the canes allowed to lie on the ground, heading in when three feet in length. A straw mulch under the canes will keep the berries clean and make picking easier. Only four to six fruiting canes should be allowed to a plant. Some varieties do better in the shade. For beginners upright cultivation is, perhaps, advisable, using a wire trellis like a grape trellis.

METHODS OF CUTTING AND CULTIVATING POTATOES.—Points in potato culture noted during experiments last year (Indiana, No. 38, pages 29) which are worthy of mention, are first, that mulching proved injurious to the crop, rather than beneficial; again, subsoiling, and also ridge culture, gave a small increase in yield, over plats not so treated. Half tubers gave a much larger yield than whole ones; also the seed ends produced a much greater proportion of large tubers than the other ends. It was found advisable to fill the trenches half full at the time of planting, plats having such treatment giving a larger yield.

SWEET POTATOES—There are numberless varieties, having a wide difference in their form, qualities and methods of growth. They seem to do best on a loose, sandy loam, fairly fertile, and particularly rich in phosphoric acid and potash. An excess of nitrogenous matter means an inordinate development of vines at the expense of the root, and so large quantities of such manures should be avoided. Experiments made during the past three or four years seem to show that the slips should be planted 15 to 18 inches apart in the row. Different varieties need to be grown for the Northern and Southern trade. In the South the Sugary Yam is liked best, and the people use no other kind. But in the North the dry, starchy varieties are preferred. Varieties which have the most ready sale in Louisiana immediately after digging are the Georgia and the Sugar. The most desirable mealy varieties are the Southern Queen, New Jersey, Barbadoes and Spanish Yam. Varieties suitable as food for stock are the Red Nansemond, Pumpkin and California.—(Louisiana, No. 13, Pages 28.)

GLANDERS.—This disease, more frequently found among horses than among other animals, is contagious and may be transmitted to man, and also sheep, goats, dogs and cats. (Alabama, No. 35, pages 19.) Horned cattle and domestic fowls seem to be proof against it, however. Temperate climates are more favorable to its development than hot or torrid regions. There are three ways, or methods, in which the disease shows itself. Nasal glanders is recognized chiefly by ulcers on the visible lining of the nose. These are usually accompanied by a nasal discharge, and by a small hard, deep-seated swelling under the lower jaw, high up near the throat under the base of the tongue. Farcy glanders shows itself by hard buds, or buttons, and ulcers, or chancres, found most frequently on the inside of the thigh or on the inside or outside of the hind leg below the hock joint, but they may occur on any part of the body. Pulmonary glanders is more difficult to distinguish. The animal usually has a rough, dry coat, indigestion and irregular breathing, as exhibited by a horse with the heaves. An animal may be affected with one or all of these symptoms. But in all its forms glanders is caused by a plant parasite, (*Bacillus mallei*). These germs may be transmitted to a healthy animal by direct contact with a diseased one, by healthy horses and mules coming in contact with the virus, nasal discharge, etc., in watering troughs, buckets, mangers and stalls infected by a glandered animal. Men who care for glandered horses not infrequently contract the disease. For these reasons all affected animals should be destroyed and their carcasses deeply buried in some out of the way place. Never throw the carcass of any animal into the river to breed disease and filth. Also disinfect all stables, watering troughs, buckets, stable utensils, etc., and completely quarantine all exposed or suspected animals until certain they are, or are not, glandered. Many States have strict laws for the suppression of this disease, and it is for the vital interests of all that they should be rigidly enforced.

QUALITY OF STRAWBERRIES.—It was found, at the Arkansas Station (Bulletin No. 17, Pages 16), that fruit ripened the first half of the season, kept fully 24 hours longer than the later crop. When sealed in air-tight packages, the fruit molded in a short time. Full exposure to the air and light darkened the berries rapidly. The best results were obtained where the fruit was covered just enough to allow a slight circulation. The crates ordinarily used for shipping were about right. The Charleston and Crawford seedlings kept the longest of any in the experiments. The Crystal City, Captain Jack, Charles Downing, Kentucky and May King seedlings, and the Windsor Chief, pistillate berry, kept the shortest time, showing damage in two days. The pistillates were nearly double the staminates in productiveness. They were also, as a rule, hardier and freer from rust. At the same time the staminates averaged a little larger, were more uniform and better developed, and were firmer and better keepers.

MARLS.—Attention has been drawn to the vast deposits of marl in Kentucky, by Hon. John R. Proctor, director of the Kentucky Geological Survey, and to their possible value as a fertilizer. A large number of samples have been analyzed by the experiment station (Bul. No. 39, pages 11). The results seem to show that most of the marls are of value as fertilizers, especially to farmers in the immediate vicinity. Marls are of recognized value as supplying lime, but, in some cases, as here, potash and phosphoric acid are found in addition. The marls of New Jersey are very valuable in these respects. Analyses of the Kentucky marls show a range in the potash present, soluble in strong muriatic acid, or all that will probably become available as plant food, of .18 of one per cent. up to 3.12 per cent. The amount of potash immediately available varies from a trace up to .55 of one per cent. The phosphoric acid is present in small amounts only. It is hardly worth while to handle marl having less than one per cent. of potash soluble in strong muriatic acid. Such potash is worth five cents per pound or, in such a case, one dollar per ton, so the marl could only be handled when the expense is light. Most of these Kentucky marls have only a comparatively small percentage of lime, being of a clayey nature, and, therefore, would be of marked benefit to light, sandy soils, their application making the soil more retentive of plant food.

Our Food Crops and Minerals.

During the decade from 1879 to 1889 the increase in mineral products was $217,911,662, or 59 per cent., while for all cereals it was $330,506,625, or 22 per cent. These figures show a steady and gradual growth of agriculture, and a more rapid proportionate increase in mineral products. The grain crops in 1879 were worth more than four times as much as the mineral products, but in 1889 only a little more than three times as much. The gain of 84 per cent. in the production of oats is noteworthy as providing more than our own supply of one of the commodities of trade. The gain of only seven per cent. in the wheat supply would indicate that the cry of overproduction of wheat is needless and harmful. It should also be noted that our corn crop, alone, is now worth almost twice as much as all our mineral products put together. The value of the different products was as follows:

	1879.	1889.	Increase.	%
Wheat	$ 459,483,000	$ 490,560,000	$ 31,077,000	7
Oats	142,751,000	263,030,000	120,279,000	84
Corn	877,296,000	1,056,446,000	179,150,000	20
Total	1,479,530,000	1,810,036,000	330,506,000	22
Mineral Products	369,319,000	587,231,000	217,912,000	59

Tar Paper and Peach-Tree Borers.—E. H. Bennett, Cabell Co., W. Va.: The tar paper we have recommended for wrapping about the stems of peach trees is known here as tar paper, roofing paper, etc., but there are several qualities, ranging from one-ply up to three-ply in thickness, also roofing felt, with an inner layer of cloth, but the lighter and cheap kinds will answer every purpose, and cost little more than ordinary brown wrapping paper. The highest price we have ever paid for the single-ply tar paper was $1 per roll of 100 square feet, and last year we paid the same for rolls containing 300 square feet. We do not understand why you should have any difficulty in cutting up this paper to the required size for wraps, for we do it with a sharp, thin-bladed knife, occasionally dipped in spirits of turpentine. The two or more sizes of peach-tree borers you find in your trees are the same species, but of different ages, yet all will usually reach maturity by the 1st of July, or earlier.

Weeds in Walks, Etc.—E. C. Trace, Sussex Co., N. J.: We do not know of anything cheaper than salt to apply to gravel walks for the purpose of killing weeds. You will need a considerable quantity for 1,500 feet of walks, but, as any coarse, refuse salt will answer the purpose, it cannot be very expensive, and will probably cost you less than the labor for pulling out the weeds by hand. Dilute sulphuric acid is sometimes used for killing weeds in walks, but usually costs more than salt. The American linden makes a handsome shade tree, especially when planted on moist soil. It does not grow as compact as the European linden, but if the stronger branches are headed in while the tree is young, any defect in form of the head may be corrected.

Lobster Refuse for Manure.—Charles Ives, P. E. Island, Can.: The refuse from a lobster cannery, at three cents per barrel, we would consider a very cheap fertilizer. It could be dissolved by treating with dilute sulphuric acid, but it would be cheaper to compost it with any good, rich soil, adding hard-wood ashes to hasten decomposition. In making up the compost heaps, use about equal bulk of the refuse and soil, dusting the ashes directly upon the lobster matter as the heap is built up, in alternate layers, and these should not be over six inches thick. After the heap is made, leave it for about a month, then begin at one side or end, and cut it down with a sharp spade and throw it over, in order to thoroughly mix the different materials of which the heap is composed. If you can make the compost six months or a year in advance of the time it is wanted for use, so much the better, because the finer it is when it is hauled out, the more evenly it can be distributed.

Sweet Corn for Fattening Steers.—D. D. Thomas, Iowa Co., Wis.: While sweet corn is not well adapted for ensilaging, it does make capital food to feed green, and, if planted as early as will be safe on account of frost, it will be in good feeding condition by the middle of July, providing some of the earliest varieties be used, such as Early Cory, Early Minnesota, or Perry's Hybrid; all of which are now quite common, so much so, that the seeds should not be very expensive. As all the very early varieties of sweet corn are quite small in growth, they should be planted much closer than ordinary field corn, to get best results. Either of the above would do well and give satisfactory yield, if planted in rows three and a half feet apart, with kernels 10 to 12 inches apart in the row. Or, if the ground is badly infested with Quack, Canada Thistles or other perennial weeds, the corn may be planted in rows both ways, three and a half feet apart with four stalks to the hill. The safest plan is to put in enough seed to insure a good stand, and then thinning out to four stalks in a hill, or, if in drills, to 10 inches apart in the rows. Of the varieties named, Perry's Hybrid is the largest and strongest grower, and will yield the most corn, and should be used if the seed is not too expensive, as it is sure, in good ground, to give from one to three ears to the stalk, averaging fully two, and the ears are of fair size. Either of the varieties named will give two or three times as much feed per acre as clover, and be very good food to hurry the steers along to market. As soon as in eating condition it can be cut for them, although it will grow better and better the longer it stands, up to full maturity.

Killing Canada Thistles.—J. Ross, Blair Co., Pa.: The one-eighth-of-an-acre patch of Canada thistles in the center of a ten-acre field certainly needs attention, else it will soon spread over the entire ten acres. Leave the ground occupied by the thistles uncultivated this summer, and, when the stalks have grown six to twelve inches high, mow them off and drop a tablespoonful or more of salt on the top of the stump of each. When the next set of sprouts has appeared, mow again and repeat the application of salt, and two or three mowings and saltings will usually destroy the roots, but if any sprouts should appear next summer, treat them in the same way. Do not trust this work to some hired man unless he is more than ordinarily careful, but attend to the matter yourself, in order to be certain that no plant is overlooked. We have known whole fields of Canada thistles to be destroyed by this process of mowing and salting, and it is not expensive, but requires care and attention, with a repetition as often as necessary, to prevent too vigorous a growth before the plants are cut down.

Undermined Farms.—Subscriber, Harrison Co., W. Va., writes us that a number of the farmers in his neighborhood who have sold the coal lying in the veins underneath their farms are now discussing the results likely to follow the removal of the coal, some claiming that it will make the land too dry for either cultivated crops, or pasture. Of course we cannot tell what may happen a few decades or centuries hence, but we very much doubt if the underdraining at the depth of the coal veins will have any appreciable effect upon the surface soil. Should the land sink a few feet, after the removal of the veins of coal, it may cause the surface ground to crack in places, but this will not seriously interfere with its cultivation. As the coal is worth more than the land above it, we would say, let it come out and trust to the future as to what may happen. It is not wise to borrow trouble over the imaginary miseries of posterity.

Egyptian Lentils.—Louis S. Durbee, Charleston Co., S. C.: The so-called Egyptian lentil is the *Lens esculenta*, or edible lentil of the botanists. It was cultivated by the ancient Egyptians and Persians, and has been grown in Europe since the time of the Roman Empire. It is still extensively cultivated in Southern Europe, Africa and Asia, for the seeds are very nutritious, but, like peas and beans, are not good for persons with weak digestive powers. There are many species and varieties, and you may find them described under various specific and generic names such as *Vicia*, *Ervum*, etc. Our seedmen rarely offer any considerable variety, but merely refer to one or all under such names as "vetches." If you send an order to a seedman for lentils, you will, no doubt, get the seed of some one of the many varieties in cultivation. All will thrive in your climate, and the true lentil much better than here in the North, for it is supposed to be a native of a warm climate, but of what part of the world, is now unknown.

Jaundice in Hens.—Mrs. J. W. V. D., Park Co., Montana, writes that she has trouble with her hens; that they are fed on wheat, rye and oats, partly roasted and partly uncooked; that they have lots of milk and good care generally, and lay well; and yet, every once in a while "there will be one or two get just as yellow as can be from the top of the head to the toes, and look as if they might have the jaundice." They die soon after being taken this way, and she wishes to know the cause and a preventive. If there is a mining camp in the locality, and if heap roasting is permitted, the fumes from this would account for nearly any disease that attacks fowls. But, assuming that this is not the case, it may be that too much milk has been fed. If it were sweet milk, there would be no danger from its free use, but if it were sour, it would need to be used with caution, the better method being to cause it to curdle over a fire, and after removing the whey, to feed the curds only. But the probability is that there has been too heavy a grain diet, and that the fowls lack vegetables in their rations. An almost exclusively grain diet might cause the hen to become deranged, and thus cause the bile to pass into the blood, so as to produce this jaundiced condition. Feed less heavily on grain; add to the diet boiled potatoes, turnips, cabbages or some other vegetable food; feed sweet milk, or, if milk be sour, feed only the curds, and those in a sparing way. Keep the premises clean and sweet. Give about two grains of calomel to each sick fowl, night and morning, one day, following the dose by a tablespoonful of castor oil. Feed sparingly on bread and water for a day or two after dosing, and then gradually restore the usual rations.

Bark-Bound Maple.—W. C. Egan, Cook Co., Ill.: The shrinking of the bark, and probably wood, underneath one side of the main stem of your soft maple tree, may be due to the presence of borers, or from sunscald, or even a bruise which injured the soft albuminous matter underneath the bark. As soon as the tree comes into full leaf this spring, make an examination by cutting away or slitting the bark with the point of a knife. If borers are found, cut them out and lay bare all the dead wood, and after scraping it smooth, smear with hot grafting wax, or pitch, and immediately dust the surface with wood ashes, or dry clay, to give the wax the same color as the healthy bark on the stem. If trees become hide-bound, or more correctly speaking, bark-bound, washing with strong lye will be beneficial, or if the shrinking is only on one side, then we approve of the old, and often condemned, mode of slitting the outer bark, not cutting quite into the solid wood.

Manuring Meadows, Etc.—George Tippenhauer, Campbell Co., Ky.: 1. We should prefer applying manure to meadows late in the fall, winter, or early in spring, than in summer as soon as the grass is cut, for in midsummer the weather may prove to be so dry that the manure will burn and become so dry as to do very little good. If coarse manure is applied to grass during moist or wet weather, the juices are carried down into the soil, and there will be little or no waste by evaporation of the volatile gases. 2. You can wrap your apple trees with brown paper and coat the outside with tar to prevent the sheep eating the bark. Wire netting or coarse strips of bark will answer the purpose, if these materials are more convenient and cheaper to apply. 3. To break a dog of the habit of eating eggs, smear a few specimens with cream, and dust with red pepper, and place them where the dog will find them. If this does not effect a cure, try smearing with bitter aloes and replace the eggs in the nests visited by the dog.

Lime, Plaster and Cotton Seed.—Ludwig Englemann, Tolland Co., Ct.: It is now too late to apply lime to your new land this season before putting in a crop and it may not need it. Apply the cotton-seed meal as you propose, as a fertilizer, then follow after the crop is well started with application of land-plaster. The plaster will not only furnish the lime, required by whatever kind of crop is grown, but also sulphur which will benefit plants of the pea family such as beans and clover. After the present season's crops are removed apply a dressing of common caustic lime if thought necessary.

Packing-House Refuse.—Subscriber, Hall Co., Neb.: If the refuse from the packing-houses contains 45 per cent. of whole or broken bones, it would be necessary to treat it with sulphuric acid, in order to make soluble phosphate, which, of course, is a valuable manure for all crops, and on all kinds of land. We would need a better description than you have given us before we could give you practical directions for reducing the materials to the proper conditions required to make it available as a fertilizer.

Date-Palm Culture.—Subscriber, San Diego, Cal.: The date palm (*Phœnix dactylifera*) is a plant requiring only the most ordinary care and cultivation, thriving in a great variety of soils and climates. If your soil is rich and good enough to grow orange and lemon trees, it will answer for the date palm. To secure a stock of plants of the best variety you have only to purchase a quantity of the preserved dates sold at the groceries or by the sidewalk venders of such articles in this and other large cities. Clean out the seed and sow in

shallow boxes or frames, giving just water enough to keep the soil moist. In a week or two the plants will appear, and will only need watering occasionally to insure a vigorous growth. When large enough to handle readily, transplant to other frames, or into rows in the open ground, and give good care and cultivation until large enough to go out into the palm orchard. If you don't care to clean out the seed yourself, just hand over the dates to the children of your neighborhood, and they will do the work and thank you for the privilege. We have often raised plants from the preserved dates obtained from venders in our streets, and the seeds, or nuts, sprout almost as readily as corn, and they may be planted at any time, but should not be allowed to remain long in a dry place after the surrounding pulp has been removed.

Filberts and Hazelnuts.—J. Hillengs, Passaic Co., N. J.: Filberts and hazelnuts belong to the same genus of shrubs or trees, and frequently are varieties of the same species. The difference is solely in the length of the husks, those with husks as long or longer than the nuts are called filberts, while those having husks shorter than the nuts are called hazelnuts. If you plant nuts of either variety you may obtain specimens with both long and short husks, filberts and hazelnuts, from the same lot. We have obtained a dozen very distinct varieties from a quart of the large Kentish or cobnut, and while some are as large or larger than the variety planted, others are small and of little value.

Weevils in Grain.—Subscriber, San Joaquin Co., Cal.: If you will send us a few specimens of the grain weevils, to which you refer, we will be able to answer your question in regard to name and species. You can destroy the weevils by fumigating the granary, when empty, with burning sulphur, but, in doing this, you must be careful not to set the building on fire. Set an iron kettle on a stone or bricks, throw in some live coals, and then scatter over these the flowers of sulphur and shut up the doors and windows. Strips of tar paper thrown into the grain or nailed on the sides of the bins will usually prevent the beetles getting into the grain.

Fertilizers for Grass, etc.—E. E. Belknap, Tuscola Co., Mich.: To increase the growth of the grass on your meadow, also winter wheat, sow some kind of fertilizer broadcast, as soon as the ground is dry enough to admit of hauling a load over the field. Fine barnyard manure will answer if scattered thinly, but if you do not have this to spare, apply any good commercial fertilizer, at the rate of three to five hundred pounds per acre. If you can get good hardwood ashes, at a reasonable price, apply ten to twenty bushels per acre, and you will probably find that such investments return a fair profit in an increased yield of hay and grain. A good windmill on a farm where there are no running streams will save much labor and time in pumping water for stock, and other purposes,

Hop-root Galls.—H. C. Kneap, Yuba Co., Cal.: We have carefully examined the hop-root galls you send and do not find any indications of insect origin; consequently, are inclined to think they are of fungus origin and one of the many species of *Heterodera* known to be the cause of galls on various kinds of plants. Perhaps if we could have one of the fresh galls for examination we would arrive at a different conclusion, but the small and very-much-dried gall sent does not afford a good opportunity for the investigation of the disease which appears to be somewhat prevalent in the hop-yards of California. We would suggest the destruction of all diseased plants and planting healthy cuttings on new and fresh ground if you desire to continue the cultivation of hops. Also experiment in the way of applying different kinds of fertilizers upon the old and affected plants, as you may find something that will destroy the fungus.

Strength of Chains.—C. S. S., Orange Co., N. Y.: Good chain made from one-fourth inch rod will weigh about .6 of a pound per foot run, and will break with a load of 3,000 pounds. Chain of a superior quality will take, perhaps, 25 per cent. more to break. This is when the chain is new. After a little wear, the strength may be reduced to almost any extent. A chain made from three-eighths-inch iron will weigh 1.3 pounds per running foot (or, say one pound, five ounces), and will break with a load of 7,000 pounds. A half-inch chain weighs two pounds five ounces per running foot, and will be broken with just a little less than 13,000 pounds. Chains are not quite twice as strong as the iron rods from which they are made. In binding, the iron loses something, and in welding a little more, so that the chain may be taken as having seven-tenths of the strength of two bars of the same size it was made from.

Roots for Sheep.—John Haines, Clark Co., Ohio, desires information whether it is best to feed sheep rutabaga-turnips and beets. By all means. Sheep do very much better with succulent food every day, and at the farthest they should have a feed at least twice a week. All these roots can be very cheaply grown, and without silage they are indispensable.

Lime in the Poultry House.—F. W. Arnold, Kitsap Co., Washington, inquires what effect air-slacked lime has on fresh poultry manure, and if the use of such lime, sprinkled on the platform under the roosts and swept up daily with the droppings, is beneficial to the manure or otherwise. The application of lime has a tendency to release the volatile fertilizing elements, and is, therefore, injurious to the manure, though its use may be useful to the fowls. Dry earth is better for both the manure and the fowls.

White-Clay Land for Corn.—George Makin, Wood Co., W. Va.: If you have, or can procure, good barnyard or stable manure, it would, no doubt, be the best fertilizer to apply to the white-clay land you describe. But if you cannot get manure of this kind, then use some good brand of commercial fertilizer, stirring in a handful to each hill at the time of planting, being careful to have it well mixed with the soil before dropping the seed. When the corn is a few inches high, or, we may say, at the time of hoeing or cultivating the second time, give each hill another handful, scattering it a few inches away from the stalks, because the roots will have spread out a foot from the stalks by that time, and the fertilizers will be mixed with the soil during the cultivating and hoeing. The 200 pounds of fertilizer was not enough on a poor soil to insure a good yield of wheat. Had you applied that amount at the time of sowing, in the fall, and as much more in the spring, the results would probably have been more satisfactory.

Protection against Frost.—T. Greiner, Niagara Co., N. Y., writes us: "The simple expedient of covering up tender plants with a little soil has saved some crops last year. A tomato grower here, seeing that frost was unavoidable, went over a one-acre patch, with sufficient help, in the evening, bending over and covering every plant, and saving them all. Another treated his corn in the same way. Of course the soil was removed again from the plants next morning. Some of my earliest potatoes and beans I managed to save by the same treatment."

Transportation of Milk.—Wm. A. McCormick, Auckland, N. Z., desires information whether any effective devices have been patented in America for the transportation of milk, and the prevention in churning in transit. Also, what are the best means of preserving milk. There are several devices used in this country to prevent milk from churning in transit. Those we have seen, were cylindrical in shape, with a top that pressed down on the milk, and devices to hold it there. When milk is delivered in bottles, the necks are so made as to be treated in the same manner. In England, there are patent preparations for preserving milk, and the use of them is approved by the authorities. In some of our States, the laws consider such milk adulterated, and punish those caught using them. Here the only preservative tolerated is haste in removing the milk from the stable, cooling it as much as can be economically done, and keeping it cool. There are machines for aerating it that are generally considered very useful.

Oat and Barley Hay.—J. P. D., El Dorado, Cal. writes us: That in his district, hay is made from a mixture of about two-thirds oats and one-third barley cut before ripening. The yield is about one ton per acre. The value of this, as food for milk cows will depend very much upon how it is fed. Oats crushed and mixed with corn meal is one of the best feeds for cows in milk. If the straw of the barley was not cut, we would consider it wasteful feeding. First feed it to a good cow, then change her to a mixture of one-third corn meal and one-third bran, and see how she likes it. In our experience with early cut, immature oats, the straw bleached out in drying, and the oat shrank until it was of little more value than the straw. We would expect much more value from the crop when left in the field until the oat was fully ripe. Barley can be cut when the straw is comparatively green, so as to make good hay, but the grain is not recommended as valuable cow feed.

Kaolin.—Mrs. M. N., Henderson Co., Ky.: Kaolin, or white clay, is found in many localities in this country but only a few of the beds are worked because the demand does not warrant it. Other kinds of clays, however, are more extensively used for making fine earthenware, and Trenton, N. J., is the great center of this industry in the United States. There are now twelve potteries in Trenton which employ about one thousand men and a thousand women and boys, and turn out $1,500,000 worth annually. Nearly all known kinds and varieties of clay are used in these works including kaolin, but a supply can be found nearer than Kentucky. We think there are some fine grades of pottery made in Cincinnati and it is possible that you might find sale for kaolin at the works there, if it is extra fine quality.

Liquid and Solid Manure.—John Cooper, Washington Co., Ore.: There is no practical means of determining the difference in value between liquid and solid cow manure, for in neither condition is it ever exactly alike. The food of the cows, and different times and seasons, would materially affect the quality and value of the manure. The advantage in using dissolved or liquid manure is in its condition, for the roots of plants cannot absorb or take up fertilizing materials from the soil except in a liquid or gaseous form; consequently, if we desire an immediate effect, we apply dilute liquid manure. In a moist climate and in moist soil it is better to apply the manure in its raw or semi-solid form, and leave it to be dissolved by the rains or water in the soil.

Asparagus Culture.—James Green, Madison Co., N. Y.: The best soil for asparagus is a warm, sandy or gravelly one with good drainage. A soil with hard-pan bottom will answer, if worked deep and underdrained with tile, but it is best to avoid such, because of the cost of preparing it for the reception of the plants. It is not advisable to place hen manure or any other kind "under the plants" as you suggest, but all manuring, except that used at the time of setting out the plants, should be applied to the surface and worked in with a light plow or cultivator. The manure will find its way down to the roots soon enough in any soil that is kept cultivated, and it is only wasted if worked in deeply, or placed in trenches under the plants at the time they are set out. Make the ground only moderately rich at the time of planting, then follow with an annual topdressing, as heavy as you can afford, or circumstances demand. Surface manuring, drainage and giving the plants plenty of room for development and growth, are the main points to be observed in cultivating asparagus.

A New Way of Draining Land.—H. Kennedy, Lawrence Co., Pa., writes us that he has tried the following method of draining his garden, which is located near the top of a hill: "The soil is a heavy clay about four feet deep and underlaid with slate, which is impervious to water. I drilled a four-inch hole, 12 feet deep, and put in two pounds of dynamite and 25 pounds of rock powder; then I inserted a double fuse, filled up the hole with dry sand, and fired the fuse. The explosion made but very little report, but raised the top of the ground at the hole about two feet, and the surface was raised all around for fully 30 feet from the hole. The expense was not very great, and the success quite decided."

Peanuts in Utah.—Orson Misener, Utah Co., Utah writes: "From what experience I have had with the peanut plant, I have become convinced that it can be raised and cultivated in this region with very little labor and good profit. Last year, I purchased and planted a pint of seed with little hope of reaping a large crop, but in the fall when I pulled the vines, I found my harvest was nine times larger than the seed I had put in the ground.

AMERICAN AGRICULTURIST
FOUNDED IN 1842

MAY, 1892.

Reform in Land Registry.

Under the system of registration of deeds prevailing in most of our American States, the records should show everything affecting the title to real estate—records in this instance meaning those of the registry office or of the probate courts.

The difficulty with this method is not with the theory, but with the practical workings; theoretically, you know the contents of every recorded paper, and, practically, you know only what you discover with the aid of the index to the names of grantors and grantees of deeds. Names may be wholly omitted from these indexes, consequently there is no absolute certainty. If the conveyances themselves were always examined, the system would be certain in its operation. It is lacking, too, in completeness, for the reason that it only provides for the registration of the instruments affecting a title, that is, the various deeds, processes, or proceedings, constituting such title, and the title will be good or bad, according as the instruments are good or bad. No matter how clear a man's title is, a new examination must be made at each new transfer of the property.

The Torrens system simplifies all this. It works admirably in Australia and British Columbia, but Massachusetts is the first in the United States to officially consider its adoption. The Torrens system is a registration of the title itself, and furnishes to every owner of real estate a guaranteed perfect title to his property, enabling him to transfer it with little delay or expense. In general the plan is as follows:

A person wishing to bring his real estate under the operation of the act fills out a formal application, in which he describes the land, gives its value, and states what, if any mortgages, or other encumbrances exist upon it, the holder of the encumbrance assenting to the application. With this document are filed his deeds, abstracts of title, and a plan of the land, made by an official surveyor and certified as correct by him. Two "examiners of titles" examine these papers and report to the registrar (or reorder, or master, as he is called in some places) of titles. If the title appears to them such as to entitle it to registration, they report favorably, and then notices are published, usually three times, in a designated newspaper, and also served on any persons whom the examiners designate. This notice states that application has been made to place the property (describing it) under the act, and that, unless a caveat is entered, a certificate will issue on or after a specified date. If a caveat (which is a short notice, sometimes called a caution, forbidding the bringing of the land under the act) is lodged with the registrar within the prescribed time, proceedings stop until either the caveat is withdrawn or the court decides on the validity of the claim; in the absence of a caveat, a certificate issues.

If the holder of the certificate sells the entire estate, he writes on the certificate a short transfer, the substance of which is that, in consideration of a stated sum, he transfers to B the estate or interest in respect to which he is registered proprietor, as set forth and described in the certificate. Or this transfer may be made on a printed form sold at the registry office. The certificate, with this assignemnt, or "memorial," is then taken or sent to the registrar's office, and a memorandum is made on the duplicate certificate in the registry. Both certificates are marked canceled; the old one surrendered and a new certificate issued, in duplicate as before, to the purchaser.

In case only part of the property embraced in the certificate is sold, a memorandum of sale, somewhat similar to our short form of quit-claim deed, is executed and acknowedged by the certificate holder to the purchaser. The original certificate, with this memorandum, is then taken, or sent, to the registrar's office, and the seller has his choice whether he will take out a new certificate for the balance of the estate, or have his old certificate marked conceled as to the lot sold. In any case a new certificate issues in duplicate to the purchaser. In all cases where certificates are issued in duplicate, as has already been said, one is bound in the registrar, and this forms what is called a root of title—that is, it is the farthest down one need go in regard to that land, all leases, mortgages, or other lesser estates being branches coming out of it. Each root of title has a separate folium (which may consist of several pages) devoted to it. Leases, mortgages, and similar estates, less than a fee, are created by the execution of a short document expressing the contract, a brief memorial of which is entered on the duplicate certificates. When the lesser estate is terminated, the instrument terminating it is brought to the registry with the certificate, and a memorial of the fact entered. If the folium becomes too much cumbered with canceled interests a fresh certificate is issued.

The essential feature of this system is that the certificate in the registrar is the sole evidence of the state of the title, and the duplicate must at all times exactly correspond with it. In every transaction the certificates must come to the registry for indorsement, and no instrument is registered or capable of affecting the title until it is noted on the duplicate certificates. This shows the importance of the certificate, and its loss or destruction would be fatal to the title if provision were not made for such an event. The statute, however, provides that when a certificate is lost or destroyed, the owner may apply to the registrar, filing a declaration of loss or destruction, in which all the facts are set forth. He is then ordered to advertise a certain number of times, and on the expiration of a given time a new certificate may be issued.

When once a parcel of real estate is thus registered, it can pass by indorsement of the certificate. The latter can thus be used as collateral for borrowing money or can be transferred with as little trouble as an unregistered bond or other negotiable paper. All the intricacies now attending the transfer of real estate are done away with, and land is made as readily available for commercial purposes as any form of desirable personal property.

The most serious difficulty in the operation of the Torrens system arises from the fact that there are no practically perfect titles to real estate. The registrar must decide correctly all legal points affecting the title, and see that nothing has been overlooked. For instance, the list of heirs must be full and accurate, every grantor of full age and sound mind, no title can have been adversely gained by occupation, and a thousand other points that the buyer of the property may want to know. These details of law and fact demand a registrar who is an extremely able lawyer, as well as an indefatigable plodder in looking up minor points, qualities which can be secured only by a very large salary.

If the system is made compulsory, the expense of transferring land in unsettled districts, providing full abstract of title, surveyor's plan, etc., is so large as to prohibit sales. It works better in the city than in the country. If the system is non-compulsory, a double set of officers, books, etc., will be required, at great expense. An objection often urged against the system is the fact that it simplifies land transfer, and thereby deprives real estate of the stability which makes it the surest and safest kind of property. The advantages of the system are that it registers the title to realty, renders unnecessary the searching of titles, simplifies the titles of realty for the future, makes purchases perfectly sure, simplifies the forms of transfer, increases the salable value of land, tends to lower the rate of interest on loans secured on land, facilitates the sale of large estates in allotments, reduces time and expense of transactions, and prevents fraud, because the certificate of title in the possession of the vendor shows the exact condition of the estate in all respects.

The Future for Farmers.

The AMERICAN AGRICULTURIST is of opinion, after careful research and conservative investigation, that American farmers, as a class, are more prosperous and in a better condition to-day, both mentally and financially, than they were one year ago. There is thus a most hopeful outlook for farmers during the year before us. The country generally is prosperous and affluent, which means that the people have a good purchasing power. Where farmers can find markets close to hand, they generally obtain more remunerative prices than if compelled to ship their produce abroad. It is thus to the interest of all farmers to help build up their own particular sections, thereby providing markets at their own doors. If these fail, or are lacking, we have the world before us, and we believe that the exports of our domestic produce in the prospective season will approximate even those of the unprecedented season just completing. This may seem a rash conjecture, but let us analyze it.

We have still available all the markets that have heretofore been open to us, and even to a greater extent, for one of the results of low prices is a larger consumption, and, when people once become accustomed to consuming American products, they will continue to demand them, even if prices be higher, because the quality was satisfactory. In addition, we have a large number of new markets opened to us through the reciprocal trade relations that have but recently been established. Heretofore such markets, with their millions of people creating a large consumptive demand, were practically closed by the high tariffs imposed upon our productions, but we now enter them as a favored nation and at an advantage over our competitors in the world's food supply.

The European demand for American produce also bids fair to continue its large proportions. Even with average crops on the Continent, Europe will be far from making up her depleted reserves, and may be expected to be a free buyer of our products of 1892.

We need only a favorable season to insure success, and, up to the present time, the indications are decidedly favorable. With careful cultivation on the part of the farmer, the growing and harvesting of good crops, we anticipate that there will be no difficulty in finding a good and profitable market for our produce. Too much of almost any of our crops can be grown, but if only a normal increased acreage is devoted to the principal staples, there is no fear as to the result.

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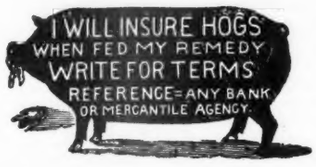

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THE AGRICULTURAL REVIEW.

Dealing in Fictitious Farm Products.

After exhaustive hearings on the subject, the Committee on Agriculture of the United States House of Representatives has submitted a bill defining "options and futures imposing special taxes on dealers therein and requiring such dealers and persons engaged in selling certain products to obtain license, and for other purposes." This measure is Bill No. 7845 on the House record, and is a substitute for the various bills the committee has considered. The report accompanying the bill is numbered 969. It gives a clear insight into the character of the measure, and its arguments are fully sustained by the bulky document of testimony taken at the hearings.

The report states that the objects sought by the proposed legislation are, to quote its own language:

First. To obtain revenue.

Second. To relieve the producer of the destructive competition to which he is now subjected by the offering, upon the exchanges, of illimitable quantities of fiat or fictitious products by those who do not own and have not acquired the right to the future possession of the articles which they pretend to offer and sell.

Third. To restore to the law of supply and demand that free action which has been destroyed by the practice of "short selling;" which practice has, of recent years, become the one mode of determining the price of such agricultural staples as can be graded, while the ordinary methods of commerce are found to suffice for those which can not. By the practice of "short selling," now so common upon the exchanges, where not to exceed one-tenth of the grain grown is marketed, prices are determined for the entire product and often months in advance of the sowing of the seed (this is especially true of the staple product of Southern plantations), thus despoiling the farmer and planter of that voice in fixing the price to be received for the product of his labor and capital which is accorded to other producers.

Fourth. That market quotations, now made by the limitless offers of fiat products by the "short seller," regardless of the value of or the volume of actual product in existence, may again be determined by the offerings of real product by the owners thereof or by those who have acquired from such owner the right to the future possession of the articles offered, and thereby to limit to the amount actually existent the offerings of the staple products of the farm.

Fifth. To prevent the overloading of domestic markets and the breaking down of prices of farm products by "short sales" made by foreign merchants for the purpose of insuring them against possible loss on purchases of Indian, Egyptian, South American, Australian, and Russian produce, whereby the American farmer and planter are made underwriters of the commercial risks of the European, by whom no bonus or premium is paid for assuming insurance risks that destroy much of the value of our products.

Sixth. That by restoring the functions of the law of supply and demand, now inoperative by reason of the limitless offers of the "short seller," a measure of relief will be given and prosperity partially restored to that great class constituting more than forty per cent. of our population, who inhabit the farms, and whose lacking prosperity, your committee believe, is due, in no inconsiderable part, to the practice of "short selling" whereby the prices of the products of the farm have been determined and fixed, during recent years, at an unremunerative level.

Seventh. To restore to the producer an honest market and such prices as will follow the unfettered operation of the law of supply and demand, which the committee believe will be sufficiently remunerative to restore, in part, the power of the farmer and planter to purchase the product of forge, factory, and mill, and thus bring prosperity to the artisan, manufacturer, distributor, and transporter.

The committee is confident that this measure will suppress the immoral practices and methods of the bucket-shops and the dealer in puts and calls, as well as carrying out the other objects above enumerated. They expect it will enable the farmer to secure such prices for his products as result from free operation of the law of supply and demand, enabling the farmer to pay higher wages to his help and greatly increasing his own purchasing power. The committee indorse the proposition, (of which C. Wood Davis is the ablest advocate, see AMERICAN AGRICULURIST for January), that the reserves of grain prior to the present year had been so greatly reduced that prices would have steadily advanced but for the sinister influences of short selling. Several pages of the report are devoted to demonstrating conclusively the well-known fact that most of these speculative sales are purely fiat or phantom produce that never existed, but are settled by payment of differences in quotations.

While the committee is confident that the measure will stop this pernicious dealing in fictitious farm products, the members are equally unanimous in believing that it will in no wise interfere with legitimate business. On this point the report is very explicit, for, considering Section 2 defining "options," the committee's report says:

The provisions of the act are not applicable to contracts with Federal, State, or municipal authorities, nor to contracts made by any farmer or planter for the future delivery of the products of his land, either grown or growing, nor to any contract to furnish any farmer or planter with any of the articles named in the bill which he may require for food, forage or seed. This section of the bill makes it clear that the farmer and planter are left at entire liberty to contract for the sale and future delivery of the product of their field, as is the merchant to contract with the farmer and planter to furnish and deliver at any future time any article which the farmer or planter may require. While this section is intended to provide the basis for the taxation of all "short sales" of farm products, and thus protect the producer and legitimate dealer against unfair and destructive competition by the vendors of phantom commodities, there is nothing, and there is intended to be nothing, which will in any wise hamper traffic in actual products, either in possession or to which the contracting party has acquired the right of future possession; but it is intended that this section shall, and your committee believe it will, in connection with other sections of the bill, suppress the vicious practice of "short selling."

Objection has been raised to the pending bill by a few of our correspondents on the ground that it licenses an evil that should be prohibited and exterminated. Theoretically, this moral objection is a strong one. Practically, however, the Committee on Agriculture have found grave constitutional difficulties in the way of directly prohibiting the evil. They expect to accomplish the purpose legitimately and without infringing upon the constitutional rights of individuals by the imposition of a tax of five cents per pound or twenty cents per bushel on all transactions in futures and options of phantom produce. This is sufficient to tax the evil out of existence, and should prove even more effective than prohibition. Thus the moral objection is fully met.

Some also fear that the measure as reported will give the millers a chance to monopolize the market and depress prices. It does not seem possible, however, that any combination can get money enough to corner the market on any of our great staples if the present system of gambling in fiat stuff is taxed out of existence. It is noteworthy that this objection is most loudly urged by the gamblers and brokers who will be thrown out of business should the pending bill become a law.

Notable Articles of the Month.

Our Common Roads.—There are 16,000,000 horses and mules upon the farms of the United States, maintained at an expense of about $4,000,000, per day, and if they are kept idle an average of 20 days in the spring of each year on account of bad roads, the loss amounts to $80,000,000 per year, a sum sufficient to build 16,000 miles of excellent highway. So reckons Mr. Isaac B. Potter in an article contributed to the April number of the *Century* magazine. In the spring of 1891, the farmers of Albany Co., N. Y., were sending telegrams to the Legislature, asking for an adjournment of a committee hearing, because the roads were too bad to permit them to go to town in time to oppose a bill which promised to make them better. France, which is about four times as great in area as New York, has spent about $600,000,00 in the construction of her common roads, and now annually spends about $18,000,000, or three per cent. of the first cost, in keeping them in repair. This road system has been of greater value to the country as a means of raising the value of lands, and of putting the small peasant proprietors in easy communication with their markets, than have the railways. To this condition is ascribed the wonderful financial vitality of France, and her solid prosperity. The wheels of market vehicles have tires six inches wide, and the rear axle is longer than the fore, so that as the vehicle moves it rolls the road for a width of one foot on each side, instead of making ruts. The cost of transportation is one-third that in the United States, as three tons at a load are hauled over country roads by one horse.

The important roads of Norway, made of fine gravel and clay, present a delightful surface for vehicles. The roads of Italy, Switzerland, Austria and some of the German States are but little inferior in quality to those of France, being likewise contrived and maintained by government.

In describing how roads should be made, Mr. Potter illustrates by diagrams the immensely increased resistance caused by a yielding surface. The greatest need of dirt roads is drainage, which is secured by means of side and cross ditches, and a center drain if it can be afforded; otherwise a mixture of gravel or sand and clay, to make a porous layer underneath. This porous mixture should be not less than 10 inches deep and laid on the rounded or sloped subsoil so as to insure easy drainage into the side ditches. Sandy roads may be improved by mixing with clay. Dirt roads need rolling regularly with a heavy roller. The writer gives minute directions for the building of Macadam and Telford roads, illustrated by numerous engravings which make the article of practical value.

Not the least effective feature of the article is the series of illustrations contrasting some almost incredibly bad country roads in the United States with roads in Germany, Switzerland, Norway and France.

Farmers Caused the Russian Famine.—Something besides drouth and hailstorms, says Consul-General Crawford in his annual report, is responsible for the famine among the peasants of Russia. The elevators of the Baltic and Odessa ports, and the storehouses on the lines of railroad, are overflowing with grain which was contracted for previous to the imperial ukase forbidding the exportation of wheat, and is still waiting for the embargo to be lifted. It is in part paid for, and is practically the property of English and German buyers who, of course, will sell it to the Russian government only at a high price. This state of affairs came about through the depreciation of the paper ruble in 1891, which enabled the Russian farmers to get 30 per cent. more in rubles for their grain than they had received in 1890. At these prices they sold all they could dispose of, leaving the peasants who worked their farms to starve. Rye, the favorite food of these people, is 100 per cent. dearer in rubles than last year. Of money and food, there is next to none, and the distress will be scarcely mitigated during the coming summer.

England Planning for Her Farmers.—That the English agricultural secretary, Mr. Chaplin, is one of the foremost among the advocates of State socialism is pointed out by Editor W. T. Stead, in the *Review of Reviews*. Mr. Chaplin's allotment bill, a Tory measure which at this writing has good prospects of enactment, provides that the County Council shall be allowed to borrow 10 millions sterling, at 3½ per cent., for the purpose of buying land from owners who are willing to sell, and reselling it to cultivators who are ready to buy, on paying one-quarter of the purchase money on the spot and repaying the balance in 50 years. Money is to be lent for buildings also, on the same terms. The object of the bill is to revive the English yeomanry by enabling small farmers to secure such holdings of land as they can manage. In the words of Mr. Stead, the law-makers of England are about "creating a kind of pawnbroker State, a State which will act as a financial agent, on a large scale, between the capital class and the poor man."

To Breed Bacteria for Dairymen.—The sole cause of the souring of milk was proved fifteen years ago to be bacteria, or germs, says Prof. H. W. Conn in the *Popular Science Monthly* for April. These are not necessarily disease germs. While in the mammary gland, the milk is free from these mircro-organisms, which swarm in the air, on the milk pan and upon the hands of the milker. By the time it is five or six hours old, milk will frequently contain fifty million bacteria to the quart. These beings multiply so fast that by actual experiment a single individual may in the course of six hours give rise to three thousand progeny. There are several species of bacteria which produce lactic acid and thus make milk sour. There are many varieties of souring, corresponding to the variety of bacteria most abundant. Although few species of bacteria are directly harmful to a healthy person, many are a nuisance because they spoil milk, and the decomposition-products which they form are poisonous, and therefore injurious to sensitive stomachs. Boiled milk is less easily digested than raw, but it is deprived of the disturbing action of bacteria.

Although keeping these organisms out of milk is a practical impossibility, much may be accomplished by cleanliness in the barn and dairy. The presence of disease-germs in milk may always be traced to filth, or carelessness in handling the milk, or to diseased cows. The only way to get rid of the bacteria is to kill them by heating the milk, or as it is called, by sterilizing it. This may be done by putting the milk into bottles, leaving

[*Continued on Page* 343.]

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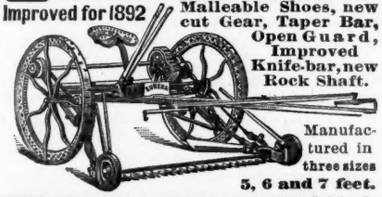

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MATTERS OF BUSINESS.

Our Meat and Dairy Products.

An examination of the export movement of our meat and dairy products, up to the end of February of the current trade year, compared with the corresponding period a year ago, does not present any strikingly encouraging features indicative of increased trade.

EXPORTS OF BEEF PRODUCTS FOR FOUR MONTHS.

	1892.		1891.	
	Pounds.	*Value.*	*Pounds.*	*Value.*
Canned,	36,599,832	$3,328,254	41,571,018	$3,384,208
Fresh,	69,038,930	5,588,958	62,105,690	4,806,414
Other kinds,	22,019,720	1,258,875	36,911,746	2,156,357
Tallow,	30,652,173	1,517,699	36,796,888	1,826,885
Totals,	156,310,655	$11,693,786	177,385,342	$12,173,858

EXPORTS OF HOG PRODUCTS.

	1892.		1891.	
	Pounds.	*Value.*	*Pounds.*	*Value.*
Bacon,	177,452,819	13,654,537	185,870,731	13,632,177
Hams,	26,085,200	2,726,526	29,737,055	2,840,184
Other kinds,	28,554,223	1,708,833	30,241,758	1,725,509
Lard,	176,398,305	12,769,366	182,400,678	12,581,287
Totals,	408,490,547	$30,860,662	428,250,222	$30,779,157

These figures show that the exports of beef products, for the current period, have decreased by 21,075,000 pounds weight, and by $479,072 in value, while the exports of hog products decreased by 19,759,675 pounds weight, but increased by $81,505 in value. An analysis of their average value for the two periods shows that the beef products were worth 6.9 cents per pound a year ago, while their present export value is 7.5 cents per pound; and that while the hog products were worth 7.2 cents per pound last year, their value is now 7.7 cents per pound for export. Therefore, it will be seen that, while the quantity of provisions that we had exported up to the end of February was less than for the corresponding period in the previous year, there has been a material gain in its value, thus minimizing the loss. The outlook, moreover, at the moment is for an increased output of provisions owing to the loss of live stock entailed by the prevalence of the foot and mouth disease in England, and also to the opening up of additional markets at the present time through the abolition or reduction in duties by foreign importing countries, as brought about by our system of reciprocity treaties. If packers made money at last year's prices, then, with live stock ruling at the same figures, they have made relatively more money during the current season's operations.

Turning to the dairy products, we have the comparative exports for the ten months of the trade years of 1892 and 1891 as follows, with 000's omitted:

	Butter, 10 Mos. Ending Feb. 29, '92.		*Feb. 28, '91.*		*Cheese, 10 Mos. Ending Feb. 29, '92.*		*Feb. 28, '91.*	
From	*Lbs.*	*Value.*	*Lbs.*	*Value.*	*Lbs.*	*Value.*	*Lbs.*	*Value.*
N. Y.,	9,335	$1,484	15,920	$2,100	58,076	$5 310	67,597	$5,825
Boston,	733	118	1,033	139	4,386	444	6,173	644
Philada.,	2	½	36	7	98	9	284	26
Balto.,	76	11	86	10	69	10	605	68
N. Orl.,	85	19	77	16	52	6	57	7
San Fra.,	332	79	305	67	214	29	233	30
Porr. Mo.,	2	½	3	3-5	53	5	104	10
Others*	2,217	351	368	56	6,040	604	8,551	728
Totals,	12,787	$2,163	17,833	$2,397	68,983	$6,417	83,608	$7,438

Here we have a decrease in exports, during the current period, of 5,046,366 pounds of butter, and 14,619,522 pounds of cheese, with an aggregate decrease in value of $1,355,663. Naturally the largest shrinkage is at the port of New York, which is the principal distributing center for our dairy products. But an improvement in the butter trade is shown at San Francisco, New Orleans and the Northern points. The decrease in the export movement of our dairy products can be largely attributed to the growing interest which is being developed therein at the different English colonies. For instance, there was a large surplus at New Zealand of 3,900,000 pounds of butter, and 4,531,000 pounds of cheese for export last year, and the bulk of this finds its way into the English market. In the dairy products, as with the provisions, our exports for the trade year just ended show an increase in value per pound, the average price of our butter exported last season being 13 cents, while this season it was 16 cents, and of cheese 8.9 cents last year, as against 9.3 cents per pound this year. The trade year just ended has closed favorably for our dairy products. Stocks of butter are not large, while prices have been ruling high of late, and stocks of cheese on hand are probably smaller than at any previous corresponding period. There has evidently been no glut in these markets, and with the improved economical facilities for the manufacture of both butter and cheese, and the higher prices that have ruled, the period under review has been, by no means, an unsatisfactory one to the producers.

*Chicago, Ill., Detroit, Duluth, Huron, Mich.

The Cotton Outlook.

There is no improvement to note in the position of cotton during the past month, yet we are of opinion that the present low prices will gradually improve. The certainty that the last crop will not exceed nine millions of bales is more assuring even than the uncertainty of previous reports. There has been a variety of causes to depress the market to a point lower than it has touched during the past 50 years. The ignorance prevailing as to the extent of the crop, the large forward movement of cotton, the decline in silver, which affected European trade, and the conservative policy of close buying, which has been adopted by the Manchester spinners, all these circumstances have had a bearish tendency. Cotton planting is now about over, and, as far as can be learned, with any degree of reliability, the area so planted will be decreased by 30 per cent. In Alabama the receipts of fertilizers this season have been but 80,000 tons, as compared with 106,000 tons last year, and in South Carolina 136,000 tons, against 185,000 tons a year ago. This shows conclusively either that the area to be cultivated will be proportionately less, or that the crop will receive insufficient fertilization, and must, consequently, be diminished in yield. The planters, moreover, owing to the low prices received for their last crop, are not in a position to thoroughly cultivate and care for the next one. Trade abroad cannot be worse, but must improve. Manufacturers in England are holding very small stocks of cotton, and have been running light, as their business was unsatisfactory. Any improvement in this direction will at once stimulate the market for the raw material. It should also be borne in mind that, in addition to a reduced crop area, there is a grave probability that the next yield will not be so prolific as the last was, for it is exceptional to have three excessive yields during three successive years. From another source we find the India crop to be some 400,000 bales short, also that India cotton is being debarred from European markets, owing to the habit now in vogue of adulterating the long-staple India cottons by mixture with short-staple cotton. So much has this been done that manufacturers in India are even compelled to import long-staple cotton from Egypt. The withdrawal of any quantity of India cotton from European markets will cause, by that much, an additional consumption of American, and the low prices, which will result in the more extended use of American cotton, will also tend to its becoming even more firmly established in continental European markets.

Our Tropic and Semi-Tropic Fruits.

For the first time in our history a special investigation has been made, by the census office, of the extent and value of the tropic and semi-tropic fruit industries of the United States. These are confined largely to the States of California and Florida, but figs, oranges, kaki, and pecans grow, to a certain extent, in all States bordering on the Gulf of Mexico, while Louisiana and Arizona, each have a considerable acreage in oranges. The following table shows the kinds of fruits grown, the acreage of each, the number of bearing trees, the value of their product for 1889, and the estimated acreage, still unplanted, that is adapted for the successful growth of similar fruits:

KINDS OF FRUITS.	Acres under Cul'vn.	No. bearing trees & plants.	Value of product for 1889.	Estim'd acr's for plant'ng trop frts
Almond	13,515	658,565	1,525,109	2,417,349
Banana	677	577,782	*a*280,653	446.481
Citron	169	4,237	(*b*)	1,153,222
Cocoanut	9,864	123,227	251,217	192,067
Fig	4,477	138,186	*a*307,271	3,013,899
Guava	550	32,943	(*b*)	2,075,300
Kaki	1,362	58,390	(*b*)	2,831,369
Lemon	7,256	167,663	988,099	1,276,648
Lime	495	19,096	*a*62,496	1,203,142
Madeira nut	12,180	188,409	1,256,958	1,185,121
Olive	7,097	278,380	386,368	2,893,116
Orange	184,003	3,885,890	*a*6,602,099	2,260,855
Pecan	27,419	214,988	1,616,576	1,546,460
Pineapple	2,189	21,750,000	*a*812,159	866,084
Pomelo	171	3,279	*a*27,216	1,349,766
Totals	271,424	28,101,036	14,116,221	24,710,879

a Value partially reported. *b* Value not reported.

While the area planted to bearing and non-bearing tropic and semi-tropic trees and plants is now only 271,424 acres, there are still 24,710,879 acres available for similar purposes. With 28 million trees, planted on 180,000 acres, yielding fruit to the value of more than 14 millions of dollars, there are possibilities, with the total available area under similar cultivation, of an output of the value of nearly 2,000 millions of dollars. Even on the basis of present prices, with all the non-bearing trees in fruitage, and no additional area under cultivation, the returns of the next census should show a product valued at more than 50 millions of dollars. And this branch of our agricultural industry is limited in its area to some half dozen of the States of the Union.

The Condition of Winter Wheat.

The Department of Agriculture, in its usual April statistical report upon the condition of winter wheat, gives the average condition of the growing crop as 81.2 per cent. as compared with 96.9 per cent. a year ago. The condition of rye is returned at 87, against 95.4 per cent, estimated in April, 1891. Seeding generally was late, especially in the Western States, and later in the Southwest than on the Atlantic coast. Unfavorable seeding conditions were drouth, difficult plowing, lumpy soil, slow germination and an imperfect stand, which were naturally followed by a late and feeble growth. The plant, therefore, was generally small when winter set in, and apparently of weak vitality, the December condition averaging 85.3 per cent., and the April returns showing a reduction of 4.1 per cent. since December. A comparison of the condition of winter wheat in the principal winter wheat States, in April of the present and two previous years is given as follows:

	Percentage Condition.		
States.	1892.	1891.	1890.
Illinois	82	97	75
Indiana	78	99	75
Kansas	77	99	87
Michigan	83	93	67
Missouri	72	96	83
Ohio	71	98	87
Average	77	97	79

The average of the winter wheat in these six States, which afford the main supplies for commerce, is thus seen to be 77 per cent. only, as compared with 97 per cent. in April, 1891, and with 79 per cent. in April, 1890. In Ohio, Indiana and Illinois the snow-covering was not continuous or heavy, in some places very light and partial, in others better than for years. In Missouri and Kansas there was still less snow, but there was some protection at the time of the March frosts. The winter generally was not severe, and in many sections it was mild, winter killing being exceptional or limited to flat and wet areas, and, in some sections, the lumpy condition of the soil is reported as modifying the injury by freezing. As the report stands, it shows a reduction of 20 per cent. in the condition of winter wheat, on April 1st, in the six principal commercial producing States, this year as compared with one year ago under similar conditions. The acreage is also believed to be less than last year.

Significant Imports of Cotton.

Notwithstanding the enormous crop of last year, our importations of cotton have been increasing. These importations are from Egypt and Peru, the cottons being sold on samples or types furnished by exporters. They are required for special work in manufacturing and cannot be obtained elsewhere, and are not grown in this country. The Egyptian cotton is somewhat similar to our Sea Island, and is of a peculiarly silky and long fiber, with a yellowish tinge. It is used mainly by thread manufacturers and makers of fine yarns, for underwear and hosiery.

The Peruvian cotton is of a rough texture somewhat like wool and of long staple, and is used for mixing with wool. It is harsh, with a long, strong fiber. It reduces the tendency of the goods to shrink, and at the same time causes a shrinkage in their cost. The total crop of this rough Peruvian cotton never exceeds 50,000 bales, and our largest imports were 12,500 bales last year. It is put up in bales of about 180 pounds. The Egyptian cotton is put up in bales of about 750 pounds each, of which we imported last year in the neighborhood of 25,000 bales.

Most of these shipments reach us by way of Great Britain, as there is no direct steam communication with Egypt or Peru. Though we have applied to numerous manufacturers and agents of American cottons we cannot learn that these importations interfere with the growth of American

(*Continued on Page* 340.)

Mr. John Hungerford

Proprietor of the fine livery stable at the West End hotel, Elmira, N. Y., says:

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In the Spring

in every respect goes way ahead of anything I ever took for **kidney and liver troubles**, from which I have suffered a good deal during the past year or two. I have taken four or five bottles and think it

Purify

has completely cured me, as I have felt well for several months. Other members of my family have taken Hood's Sarsaparilla for general debility and for purifying the blood, and have been highly gratified at the good it has done them. I always feel safe in recommending it to my friends." JOHN HUNGERFORD, West End Hotel, Elmira, New York.

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At this season nearly every one needs a good medicine to purify the blood and expel the impurities which have accumulated during the winter. Hood's Sarsaparilla is so well adapted for this purpose that it is beyond comparison as a **Spring Medicine**. It expels every trace of Scrofula and humor from the blood, and imparts new life and vigor. Remember,

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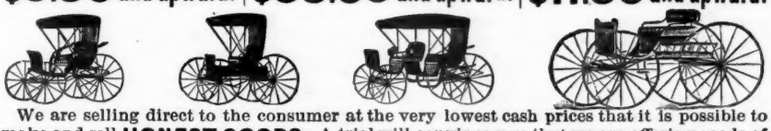

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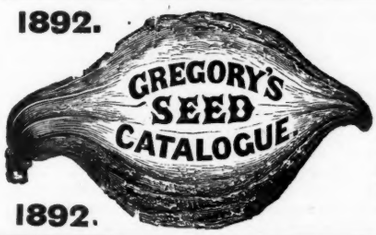

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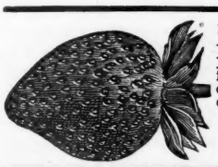

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Deep Cut on Leg.—H. W. Jackson, Cache Co., Utah, has a fine young horse that had a deep cut on the hind leg five months ago. It has left an open ulcer, with enormous swelling of leg. Cleanse, night and morning, with hot water, containing an ounce of crude carbolic acid to a pint of water. Apply to sore on leg with a sponge.

Diarrhœa in Mule.—Jacob A. Buscher, Jefferson Co., Mo., has a valuable mule that has had diarrhœa for nearly two months. Give the mule four ounces of spiced syrup of rhubarb in a pound of linseed oil. After it operates give, three times a day, the following: Powdered chalk and hyposulphite of soda each one ounce, powdered opium one dram, powdered catechu two drams; mix in molasses to make a ball. Put in drinking water alternately, one day, a piece of unslacked lime as large as a walnut in a pail of water, and next day put in the water two drams of sulphate of iron. Take off the chill of the water, and give only two quarts at a time of either drink. Boiled milk may be given once daily in two-quart drinks. Feed only a little clean hay, night and morning, also three times a day two quarts of ground oats, a handful of whole flaxseed, and a pint of wheat middlings, gradually increased to a quart. Blanket warm, and groom well daily.

Ewes Delicate After Lambing.—G. W. Chickering, Columbia Co., N. Y., has several ewes that are delicate and feed badly after lambing. Give cow's milk, warm, with two ounces of spiced syrup of rhubarb. For the next few days give a pint of warm milk, in which a teacupful of wheat middlings is stirred.

Catarrh of Driving Horse.—W. S. Richard, Ottawa Co., Kansas, has a fine driving horse that has a mucous discharge from the nose. When checked high the breathing is thick and wheezy. Remove the check-rein, and steam the nose with a nose bag in which an ounce of crude carbolic acid is put, after a gallon of hot water is poured upon the bran put in the bag to hold the steam. This is done after the horse is brought in after work at night. Blanket warm. A physic ball may be given once a week for two or three times. A chronic nasal discharge in the horse is troublesome, and may be offensive. A teaspoonful of clorinated lime thrown into the manger or nose bag will dispel the odor.

Mumps in an Ox.—T. F. T., Austin, Texas, asks, Do cattle ever have mumps? He states that "among a purchase of working oxen, one had a swelling at the junction of the jaws. Soon after he was yoked to one of my old oxen on my farm, and after a week or so this ox also had a swelling come in the same place, only on the opposite side." Yes, cattle do have mumps, and the affection is contagious.

Canker in Ear of Dog.—J. W. C., Salt Lake, Utah, has a valuable St. Bernard dog that shakes his head, carries it sidewise, is dull and indisposed to move about, scratches his ear, and often yelps out because of the pain. The inside of the ear looks rough, and an offensive discharge collects in it. The dog was fond of swimming and diving after sticks and stones thrown into the pond. Water dogs that are overfed and fat are most subject to this malady. It is not because water runs into the ear and creates inflammation, but because the heads of water dogs are seldom under water, and that those parts become congested in consequence, and also because of the sudden and frequent chills from exposure in cold weather. Cleanse the ears daily with warm water, into which put a few drops of carbolic acid, using a syringe carefully. A lighter vegetable and milk diet is indispensable. So, also, is physic. Ten grains of powdered aloes and two or three grains of calomel, rubbed up with sugar, should be given twice a week. Early and persistent treatment will prevent the disease from becoming chronic, which is difficult of cure in that stage. Ointments, though agreeable to the dog, become rancid from the natural heat of the body and from the difficulty of cleansing the ear after application. Therefore local remedies should be used in solution in water, so that every syringing perfectly cleanses and removes all secretions. Two grains of sulphate of zinc to an ounce of water, and two grains of sulphate of copper in the same quantity of water, kept in separate bottles and used alternately, best answer the purpose of cure.

Cotton-Seed Meal for Farm Animals.—J. Ireland, Hays Co., Texas: It is not advisable to feed cotton-seed meal or hulls to horses. For cattle, they are a valuable food, but great care must be taken not to overfeed with the meal in the beginning. Commence by feeding daily not more than two pounds of meal mixed with bran. We know one farmer who says he feeds eight pounds daily to cows with good results. In feeding beef cattle with the ordinary form of cotton-seed meal this amount would quickly get them "off their feed," but cows can gradually be brought to consume more than steers. But with both, always begin with not more than two pounds and gradually increase the quantity, watching them carefully. Fed with care and discretion, cotton-seed meal and hulls are excellent food for ruminating animals.

Canker in the Windpipe of a Hen.—J. K. St. Clair, Mich., has a White Leghorn hen which holds up her head, opens her mouth and gapes frequently as if she had something in her throat. The hen probably has canker in the windpipe. By opening the beak and pressing the windpipe up into view, a white, cheesy matter will probably be discovered. Remove this, causing as little bleeding as possible. and paint the surface with tincture of iodine. If the matter returns, repeat the treatment.

Warts and Scratches on Cows Teats.—S. C. Gordon, Brown Co., O., writes us: "I have had considerable experience, in the last 20 years with cows, running in pastures infested with briers, which scratched their teats so badly that it was a very disagreeable task to milk them. Their teats became literally covered with warts, but by anointing them freely and frequently (every day or two) with lard, they soon disappeared. Warts on other parts of the body, as the legs, as large as walnuts, succumbed to the same treatment. I have put a ligature around some large ones with a small neck, and got rid of them, but I like the lard treatment best of any."

Swollen Leg of Mare.—L. U. Winslow, Thomas Co., Kan., has a mare that was badly cut on a barb-wire fence when a sucking colt, and has ever since had a swollen hind leg, on which are numerous pimples or boils. As the fore limbs seem also the seat of these annoyances, it is probable that the blood is not in a good condition, though the mare and foal seem in perfect health, and the mare is again in foal. Keep the limbs cleansed with carbolic soapsuds, after opening the boils when ripe. Give a bolus of the following once or twice a week: Powdered aloes, two drams; powdered resin, three drams; powdered niter, three drams; powdered ginger, two drams; castile soap, two drams. Beat up into a mass for one bolus. This is a highly useful, gentle, cooling, laxative, with some diuretic action also. The druggist should make up six of these, which may be sufficient for the case.

Parturient Apoplexy, or Milk Fever.—The best cows are the most liable to milk fever. It only attacks deep milkers, and the better the condition of the cow for secreting large quantities of milk, the greater are the chances of an attack. It never comes with the first calf, and never with cows which are allowed to run free and suckle their calves, as are the great herds of the Western plains. It generally appears about the third day after calving. The most marked symptoms are loss of appetite, fever, staggering gait, dull, staring eyes, rapid pulse, costiveness, uneasiness and great distress.

Treatment—Place the sick cow on a level floor, with plenty of clean straw under her, in as natural a position as possible, with the head on a level with the body. Administer 6 to 12 drams, according to the size of the animal, of chloral hydrate in a pint of molasses. Repeat this every two hours, until the symptoms abate, and the cow can hold up her head steadily. Immediately after the first dose give an injection of warm soapsuds. If it can be managed without disturbing the cow, wrap her in a piece of old quilt or carpet wide enough to reach from the hips to the shoulders, and go entirely around her, just wringing it out of tepid water, and then wet it from time to time, as it dries. Do not interfere with the udder until recovery begins, then draw a little milk at a time, but not enough to draw it dry, until all danger of a relapse is passed. From first to last let everything be done as quietly as possible, and avoid everything which will increase the nervous excitement of the sick cow. If the remedy above mentioned is not at hand, give as early as possible half a pint of whisky diluted with water and sweetened, and repeat every two hours, or until the more efficient remedy can be obtained. Bromide of potassium, in large doses, dissolved in water and sweetened, is administered with fair success, either alone or in combination with the chloral hydrate. Bleeding, giving drastic purgatives, drawing the udder dry, and other heroic treatments, have no place in the practice of skilled veterinarians.

Quarter Crack.—Henry Hoffmeyer, Cumberland Co., N. J., has a valuable horse that had a quarter crack when purchased, which grew out by careful shoeing and treatment. But as it broke out again, he desires to know the cause of the accident, and a permanent cure. There is a weak point in every animal, and when an exciting cause occurs, disease or accident ensues. The quarter crack results from fast driving on hard roads. The treatment is both curative and protective, as well as preventive—a proper shoe that will hold the severed parts securely together, the paring out of the dead hoof, and filling the crevice with melted wax and lard to keep out grit and dirt, so that the hoof may grow down or out. Great care in driving must be observed. Running and trotting horses used in severe races are liable to quarter crack, which generally causes their withdrawal from the turf or track.

Lump Jaw.—Oscar Schafer, Spink Co., South Dakota, has a steer two years old, that has a swelling under the jaw, that made its appearance at about seven months of age. This is a case of Lump Jaw or *Actinomycosis*, a cancerous tumor. It was hereditary, and might have been removed by a veterinary surgeon, but, still, it might have reappeared. Though it is common among young steers fattened, slaughtered and consumed as beef, yet it is unsightly, and the disease should be eradicated from herds of cattle bred for beef, by great care in selecting breeding animals of sound constitution, free from any predisposition to disease of any kind or character. This is a demand of the public that should be scrupulously respected by the great breeders and herdsmen of the West.

Sick Hog.—George Prell, La Plata, Co., Colorado, has a sick hog which eats but little, is thirsty, has red spots all over the body, especially on the upper lip, flanks moving, appears dull and heavy. From the brief sketch of the case, it appears more like the contagious fever of swine, or hog cholera. Separate all sick and suspected animals as soon as discovered. If the disease is contagious, dead animals should be buried deep, after having been sprinkled thickly with quicklime.

Good Work of Farmers' Clubs and Institutes.—A. W. Litchard, Alleghany Co., writes us: "From an agricultural point of view Alleghany county is making rapid advancements. Much of this is due to the fact that we have a live farmers' club of over seven hundred members. Meetings are held every month and the best talent available is engaged to assist in the discussions. The Farmers' Institutes are also doing a great amount of good in the way of stirring up our farmers to be more thoughtful, and to show them how to secure better success. By the way, our farmers are learning that the very best investment they can make is to subscribe for a good agricultural paper. The AMERICAN AGRICULTURIST is well thought of and read with much interest. Each number of this grand magazine is a welcome guest at our home, with the young as well as the old."

A Fifty Years' Reader of the American Agriculturist: Livingston Robb who died recently at his home in Huntington county, Pa., at the age of 72, was a subscriber to the AMERICAN AGRICULTURIST from its beginning, and has read every number published during the fifty years of its existence. He was one of the most honored citizens of his county, and an untiring promoter of agricultural education.

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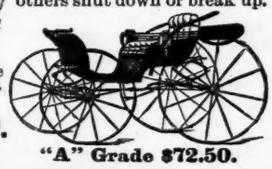

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MATTERS OF BUSINESS.

(*Continued from Page* 336.)

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Personal, Commercial and Agricultural.

What to Save, and how to save it, are subjects which interest all prudent housewives. This information is given in "Ayer's Home Economies," containing One Hundred Recipes for using odds and ends from table and market. It is a book especially valuable to young housekeepers, and will afford many new and useful hints even to those more experienced. "Ayer's Home Economies" mailed to any address on receipt of 2-cent stamp, by Dr. J. C. Ayer & Co., Lowell, Mass.

A Clever Idea in Time Tables.—The "Common Sense" time table recently issued by the "Burlington Route" is the latest idea in this connection, and furnishes more concise information for less time spent in research than anything yet produced. The peculiar alignments perfected between stations on the map, and the same stations in the time tables either side of the map, is such that a traveler at a glance can note time of arrival and departure, distance from terminal points, population, signal stops, restaurants, meals and connections. There are no foot notes or reference marks to distract the attention. No questions need be asked by the holder of this table, the arrangement being exceedingly novel and clear. The table is the invention of Mr. W. M. Anthony, Advertising Agent of the Burlington Co.

We call attention to the advertisement of Geo. Ertel & Co., Quincy, Ill., in another column of this issue. The Victor Press is one of the most perfect presses on the market, and the factory of Messrs. Ertel & Co., is devoted exclusively to the manufacture of Baling Presses. They offer to ship a press on trial to any point in the United States or Canada to work against any other make, the party testing them to agree to buy the one doing the most and best work for the least money.

Aeration of Milk.—Extensive experiments conducted at the Agricultural Experiment Stations have given unmistakable evidence of the great advantage of aerating milk. That milk which has been properly aerated is sweeter, purer, and keeps longer than milk which has not been so treated is an established fact. Of the various machines constructed for the purpose, Hill's Milk Aerator is the most perfect and efficient. Dairymen everywhere will find it to their advantage to investigate the subject and write to E. L. Hill, West Upton, Mass., for his dairyman's circulars.

For Lovers of Good Tea.—A most remarkable offer is made by the Great American Tea Co., New York, whose advertisement appears on another page of this number. The offer is nothing less than to send, free of charge, a sample of their best mixed, or any other tea the applicant may select. From what we know of the reliability of this company, we can vouch that they will fulfill their promises.

Best Buggies and Harness at Low Prices.—The Miami Mfg. Co., of Cincinnati, Ohio, dealers in buggies, harness and other merchandise, offer this season a remarkably attractive line of goods. Cash buyers will find it to their advantage to send for the new catalogue of this company advertised in this number.

Bees.—Send your name for free samples of bee veils, comb foundation, advice to beginners, and circulars of bee book, smokers, etc., or send *eight* 1c. *stamps* for a 24-pamphlet on *Taming and Handling Bees.* Write to Dadant & Son, Hamilton, Ill.

The Eureka Mower.—Having ourselves used one of the very first Eureka Mowers manufactured, we are glad to know that this machine, excellent as it was then, has been gradually and steadily improved. The advantages of a direct draft mower will be at once appreciated by anyone who has seen the Eureka at work. As the horses do not walk over the cut grass, which is left in an almost upright position, the curing of the hay is effected in a much shorter time than it could be done otherwise. The Eureka Mower Co., at Utica, N. Y., have kept abreast with the times and have one of the best appointed factories in the country, manufacturing, not only these mowers, but a number of other valuable farm implements.

The Baby.—The invention of a machine which would cheaply and easily, both by hand and light power, separate cream from milk has been one of the greatest desiderata in dairying. Fortunately this long-felt need has been filled by the introduction of the Baby Cream Separator, manufactured by the De Laval Separator Co., New York city. The various sizes manufactured make the machine adapted for any degree of power and applicable to individual conditions and requirements. The great advantage of these separators in

(*Continued on Page* 342.)

Little Miss Muffet sat on a tuffet
Bothered with dirt and rust;
But her tray was soon bright,
And she laughed with delight,
While she sounded the
praise of
GOLD DUST.

All Grocers sell **GOLD DUST WASHING POWDER.**

N. K. FAIRBANK & CO., Sole Manufacturers,

CHICAGO, ST. LOUIS, NEW YORK, PHILADELPHIA, BOSTON, BALTIMORE, NEW ORLEANS, SAN FRANCISCO, PORTLAND, ME., PORTLAND, ORE., PITTSBURGH AND MILWAUKEE.

DEERING

BINDERS MOWERS TWINE

1891 SALES **137,665** MACHINES

AND TWENTY-SIX **MILLION** POUNDS OF TWINE

GET A COPY OF **"GRASS, GRAIN & GAIN"** A BOOK FOR FARMERS

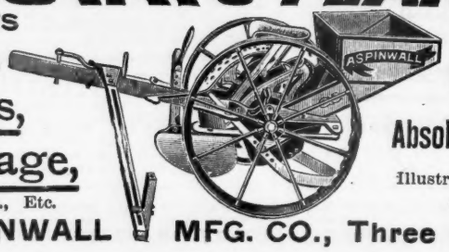
DEERING AGENTS EVERYWHERE

WM. DEERING & CO. CHICAGO, U. S. A.

"ASPINWALL"

POTATO-PLANTER

PLANTS **Corn, Beans, Ensilage,** Etc., Etc.



DISTRIBUTES FERTILIZERS.

Absolutely Guaranteed.

Illustrated Circular sent Free. (*Mention this paper.*)

ASPINWALL MFG. CO., Three Rivers, Mich.

HOUSEHOLD ARTICLES.

BEST POLISH IN THE WORLD.

RISING SUN STOVE POLISH

DO NOT BE DECEIVED with Pastes, Enamels, and Paints which stain the hands, injure the iron, and burn off. The Rising Sun Stove Polish is Brilliant, Odorless, Durable, and the consumer pays for no tin or glass package with every purchase.

HAS AN ANNUAL SALE OF 3,000 TONS.

HOME COMFORT STEEL FAMILY RANGES.

No. 64.

The ONLY Range in the World made of MALLEABLE IRON AND WROUGHT STEEL!

This style Range, No. 64, is sold only by our Traveling Salesmen from our own WAGONS, throughout the U. S. and Territories.

MADE ONLY BY THE

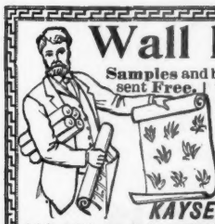
Wrought Iron Range Co.

PAID UP CAPITAL, $500,000.

Established 1864. ST. LOUIS, MO.

Write for COOK BOOK.—Mailed FREE.

Wall Paper.



Samples and book 'How to Paper' sent Free.

White Blanks 3½c.
New Golds - - 9c.
Embos'd Golds 15c.

Painters and Paper Hangers send business card for our large Sample Books by express.

KAYSER & ALLMAN,

410-418 Arch St., Philadelphia, Penna.

JOSEPH GILLOTT'S STEEL PENS.

GOLD MEDAL, PARIS EXPOSITION, 1889.

THE MOST PERFECT OF PENS.

If You Have an Eye

for beauty you can appreciate our efforts in the wall paper line. 100 samples mailed for 8 cents. Prices, 5 to 50 cents a roll.

A. L. DIAMENT & CO., 1206 Market St., Phila.

WALL PAPER SELECTED BY MAIL. Large variety, latest styles at factory prices. Send 8 cents postage for a full line of samples.

THOS. J. MYERS, 1210 Market St., Phila., Pa.

"A MAN OF GOOD REPUTE—As salesman in your vicinity. Will engage for one year if first month's work is satisfactory. Address, ELDRED JOHNSON, Manager, No. 67 5th Ave., N. Y. City."

SILKS.

Never before have we seen so great interest manifested in this exquisite fabric by the most competent judges of Fashion.

The types and Styles for this Season are not only beautiful in themselves, but they are specially adapted to the uses demanded of them.

Moires, always a guarantee of richness and elegance, are shown in a multiplicity of styles;

In Taffetas Glaces and Taffetas Rayes the effects are pretty and simple;

The Illuminated styles on changeable Twills are such as to meet with general approval;

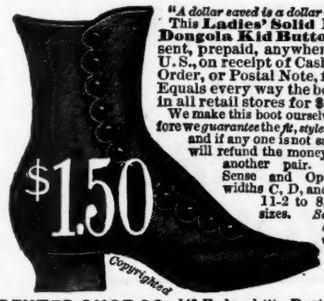
In the Damas patterns neatness and elegance prevail;

Oriental Silks are in profuse variety and very attractive.

JAMES McCREERY & CO.,

Broadway and 11th St.,

NEW YORK.



$1.50

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"A dollar saved is a dollar earned." This **Ladies' Solid French Dongola Kid Button Boot** sent, prepaid, anywhere in the U. S., on receipt of Cash, Money Order, or Postal Note, for $1.50. Equals every way the boots sold in all retail stores for $2.50.

We make this boot ourselves, therefore we *guarantee* the *fit, style and wear*, and if any one is not satisfied we will refund the money or send another pair. Common Sense and Opera Toe, widths C, D, and E, sizes 11-2 to 8, in half sizes. *Send your size; we will fit you.* We deliver **Free.**

DEXTER SHOE CO., 143 Federal St., Boston, Mass. (Formerly 299 Devonshire St.

Buy Your WALL PAPER By Mail

AT WHOLESALE PRICES

Handsome New Designs, 3c a roll.
Beautiful Gilt Papers, 5c a roll.
Elegant Embossed Gilt Papers, 8c a roll.
4 to 9 Inch Borders, Without Gilt, 1c a yard.
4 to 18 Inch Borders, With Gilt, 2c and 3c a yard.
Send 8c to pay postage on over 100 samples.
Address F. H. CADY, 305 High St., Providence, R. I.

GENUINE STANDARD SINGER Sewing Machines. Latest improved. Best made. Noiseless. Warranted 5 yrs.

SAVE MONEY now while you can get a Complete set of attachments FREE. Adapted for light or heavy work. Light running. Nicely finished. Send for catalogue.

$35.00 Machine for $9.50
$45.00 " " $14.00
$55.00 " " $18.50

CASH BUYERS' UNION, 258-266 Dearborn St. B. 81, Chicago.

MY WIFE SAYS SHE CANNOT SEE HOW YOU DO IT FOR THE MONEY.

$12 Buys a $65.00 Improved Oxford Singer Sewing Machine; perfect working, reliable, finely finished, adapted to light and heavy work, with a complete set of the latest improved attachments free. Each machine guaranteed for 5 years. Buy direct from our factory, and save dealers and agents profit. Send for FREE CATALOGUE.

OXFORD MFG. COMPANY, DEP'T D. 7. CHICAGO, ILL.

PERFECTION

KEEPS FLOUR PERFECTLY DRY AND FREE FROM DIRT VERMIN ETC.

COMBINES BIN SIFTER PAN & SCOOP. AERATES AND PRESERVES FLOUR FROM MOLD

FLOUR BIN AND SIEVE

Avoids the great inconvenience of reaching into a barrel or sack. No scattering. Saves time and waste. Once tried you would not be without it for many times its cost. Send for circular.

Prices to hold { 25 lbs. $2.50 / 50 lbs. $3.00 / 100 lbs. $4.00 }

Your dealer sells them or ought to. If he does not please write to us.

SHERMAN & BUTLER, Manufacturers, 26-28 W. Lake Street, CHICAGO, ILL.

GOLD MEDAL, PARIS, 1878.

W. BAKER & CO.'S

Breakfast Cocoa

from which the excess of oil has been removed,

Is absolutely pure and it is soluble.

No Chemicals

are used in its preparation. It has *more than three times the strength* of Cocoa mixed with Starch, Arrowroot or Sugar, and is therefore far more economical, *costing less than one cent a cup.* It is delicious, nourishing, strengthening, EASILY DIGESTED, and admirably adapted for invalids as well as for persons in health.

Sold by Grocers everywhere.

W. BAKER & CO., Dorchester, Mass.

BOILING WATER OR MILK.

EPPS'S

GRATEFUL—COMFORTING.

COCOA

LABELLED 1-2 LB. TINS ONLY.

WHICH ONE SHALL WE SEND YOU

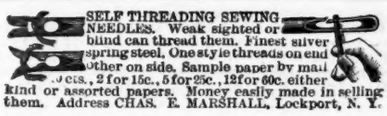
EACH CATALOGUE IS COMPLETE IN ITSELF.

Accordions, Auto Harps, Auto Harp Music, Banjos, Banjo Music, Violins, Violin Music, Violin Bows, Clarinets, Flutes, Violin Cases, Clarinet Music, Flute Music, Guitars, Cornets, Violin Repairing, Guitar Music, Cornet Music, Harmonicas,

C. W. STORY, 26 and 28 Central St., Boston, Mass.

LYON & HEALY, 154 to 166 State St., Chicago.

Will Mail Free their newly enlarged Catalogue of Band Instruments, Uniforms and Equipments, 400 Fine Illustrations, describing every article required by Bands or Drum Corps. Contains Instructions for Amateur Bands, Exercises and Drum Major's Tactics, By-Laws and a Selected List of Band Music.



SELF THREADING SEWING NEEDLES. Weak sighted or blind can thread them. Finest silver spring steel. One style threads on end the other on side. Sample paper by mail 10 cts., 2 for 15c., 5 for 25c., 12 for 60c. either kind or assorted papers. Money easily made in selling them. Address CHAS. E. MARSHALL, Lockport, N. Y.

52 IN A YEAR

A feast every week prepared by MARION HARLAND and other bright women for the HOUSEKEEPER'S WEEKLY. This famous paper, whose novelty and brightness have made it such a success, fills the place of a dozen monthlies. It gives you a new sensation. $1.00 a year. Every *yearly* subscriber, if she subscribes within one month and mentions this paper, may become a shareholder in our *Dividend Fund* by sending certain selected names. (A blank with instructions sent on receipt of subscription.) *No free samples.* Ten weeks' trial. 25c. HOUSEKEEPER'S WEEKLY. Philadelphia, Pa.

MATTERS OF BUSINESS.

(*Continued from Page* 340.)

increase of yield, betterment of quality, and saving of ice, time, and labor is recognized by all progressive dairymen. The price for these separators is now so low as to insure their introduction into even the smallest dairies. For additional information, the reader is referred to the advertisement of this company in another column.

Important to Land Seekers.—The only road running into the new lands opened for settlement is the Chicago, Rock Island & Pacific. These lands are the Cheyenne and Arapahoe Reservations, which, by President's proclamation, are put on the market, and lie directly west of Oklahoma. The Rock Island road runs a magnificent train service from Chicago, Kansas City, Minneapolis, St. Paul, Omaha, Lincoln, St. Joseph and Denver, and important mountain cities, to the towns above mentioned. You need a sectional map, showing each piece of these lands, and it will be sent to you, or any friends you desire, free, by addressing John Sebastian, G. T. & P. A., C. R. I. & P. R'y, Chicago, Ill.

A B C of Agriculture.—This is the title of a pamphlet issued by W. S. Powell & Co., Baltimore, Md., and which is sent free to all readers of the AMERICAN AGRICULTURIST who apply for it. In it are given many useful hints about fertilizers and how to use them to the best advantage.

Chicago's Remarkable Growth.—New factories which locate, not inside Chicago, but in its suburbs, have built up South Chicago, Hammond, and Hegewisch. Griffith has superior facilities for manufacturing enterprises, and manufacturers are recognizing its advantages. History shows that Chicago's factory suburbs double every two years until they become cities. Griffith's unequaled advantages are building it rapidly from a small suburb into a large city. The shrewd investor buys in a small suburb and sells in a large city. Griffith lots, cost $120 to $600 on easy terms. Jay Dwiggins & Co., Room 40, No. 142 Washington St., Chicago, Ill., send full particulars on application.

How to Increase the Value of Manure.—It is a well-known fact that, other conditions being equal, a uniform degree of fineness of the manure used, as well as its even distribution over the land, adds, in no small degree, to its fertilizing effects. Spreading manure by hand has always been found laborious and unsatisfactory, and, as this has to be done at a season when labor is most valuable, it is a matter of no small expense. With the introduction of Kemp's Manure Spreader, a radical change has been effected in this kind of farm work, and one of no less importance than was the substitution of the mowing machine for the scythe in the hay field. These machines, as now manufactured, are simple in construction, durable, and easily managed, and the saving of labor in their use will soon pay for the cost of them. A neatly illustrated catalogue gives a full description of this excellent machine, and may be obtained from the Kemp & Burpee Mfg. Co., Box 32, Syracuse, N. Y., if the AMERICAN AGRICULTURIST is mentioned.

What You Can Do and What we can Do" is the name of a very prettily gotten up primer on "*tasteful wall decorations and paper hanging*," issued by A. L. Diament & Co., 1206 Market street, Philadelphia. They send it, for the asking, to all our readers who are interested in the subject, and to such we would say that Messrs. Diament & Co. are old advertisers, and are, we believe, in every way trustworthy and reliable.

A Prize for American Agriculturist Subscribers.—Why are Murray's Buggies and Harness "Better than Gold?" Both are attractive, useful, and ornamental. Either will go fast enough. One of the "Murray" world-renowned $55.95 Buggies for the best reason why, and a set of the "Murray" $5.95 Harness for the next best reason. Study the advertisement and send for their catalogue; ask your neighbors and friends, and then write your "Reason Why" to the Wilbur H. Murray Mfg. Co., at Cincinnati, O., before June 1st. Mr. Murray will be the judge in awarding the prizes, which will be announced in our July issue. This offer is open only to owners of horses, who use buggies and harness, and are in a position to give the above reason.

A Popular Windmill.—The country is being dotted with miniature Eiffel towers—steel windmills on steel frames—like spider webs anchored to the ground. Among these will be seen many Decorah Steel Windmills and Towers, with powerful steel sails, turning so smoothly that there is motion in very slight breezes. A compression-coil spring governor keeps the motion regular. The brake does not strain on the pull-out chain. The self-oiling reservoirs carry three months' supply of oil for the four bearings. The stroke is adjustable to any pump. The towers are built strong, and the braces can be drawn up tight. The Goulds & Caldwell Co., of Chicago, manufactures these excellent mills, for the convenience and profit of the farmer. See their advertisement in another column.

It Pays to Use First-Class Paint.—The average cost of applying paints is from two to four times as much as the cost of the paint itself. It is, therefore, questionable economy to expend from $50 to $100 for labor in applying $25 or $30 worth of inferior paint, which—after a year or so, affords neither protection nor ornament—when a first-class paint, costing 20 per cent. more, would last two or three times as long. A gallon of paint, composed of the best materials, thoroughly combined, will, in consequence of its superior body and capacity, cover from 20 to 25 per cent. more surface than a gallon of such paints as are commonly sold. The "Asbestos" Liquid Paints, manufactured by the H. W. Johns Mfg. Co., can be recommended for their purity, durability, and covering qualities. Their use, for years past, on many of the most prominent hotels and public buildings throughout the United States is a sufficient testimony to their high quality.

The Alliance Carriage Co.—From a small beginning, three years ago, the Alliance Carriage Co. has grown into one of the largest and most extensive carriage factories in the world. By manufacturing their own goods, and selling direct to the users of the vehicles, the purchasers save the entire commission usually obtained by middlemen. With such advantages, and by furnishing only the best class of goods, it is not surprising that this company has had such marvelous success. Their new catalogue is brimful of interesting and valuable information for all who are in need of wagons and harness of any kind. By addressing the Alliance Carriage Co., Cincinnati, Ohio, mentioning the AMERICAN AGRICULTURIST, this catalogue may be had free.

High-Grade Bicycles.—The Lovell Diamond Cycles, manufactured by the John P. Lovell Arms Co., Boston, Mass., are rapidly gaining in favor wherever they are known, and are making a record for themselves of which any one might feel proud. Several improvements have been made recently, without increasing the price. None but the best material is used in their manufacture, and the greatest care in the fitting of the parts is exercised, and no piece is put into any of these machines until it has been thoroughly tested. All the wheels used in these machines are guaranteed, and the company will make good any imperfections that may be found in them not caused by misuse or neglect. The handsome illustrated and descriptive catalogue of this company will be mailed free to all applicants mentioning the AMERICAN AGRICULTURIST.

Safety in Fence Posts.—Durability and strength, combined with cheapness and ease of setting, constitutes the ideal fence posts. Such an one is manufactured by the Anchor Post Co., whose advertisement appears on another page of this number. The use of these posts does away with all the work of digging holes. In addition to these posts, the company offer a large assortment of useful and ornamental fencings of every description.

American Rose-Comb Dominiques.—This excellent breed of fowls, which by some fanciers, is thought to combine more desirable qualities than any other, is made a specialty of by George K. Hawley, Glens Falls, N. Y.

The Richmond Fence.—The importance of selecting only the best material for fencing is not realized sufficiently by farmers in general, and it is surprising how many persons, for the sake of a few cents per rod on the first cost of material, use kinds which are almost worthless for fencing purposes. The best wood for fence slats is that of white oak; this, together with No. 9 steel wire, is what is used by the Elliott & Reed Co., Richmond, Ind. The excellency of this combination has made the Richmond fence popular in almost every section of our country.

AYER'S Sarsaparilla

CURES OTHERS WILL CURE YOU

Are you troubled with loss of appetite, nausea, biliousness, sick headache, offensive breath, or a bitter taste in the mouth? Are you fretty and nervous? Do you have drowsy, dizzy sensations, a feeling of being all tired out, continued languor, and of general discomfort? These are symptoms of impure blood, usually manifested in

The Spring Season

and for which **AYER'S** Sarsaparilla is the Best, the Superior Medicine. Close confinement during the winter, in poorly ventilated, over-heated rooms, work-shops, and offices, excess of animal food, and lack of out-of-door exercise have poisoned your blood. It is this which causes Loss of Strength, Lassitude, Sleepiness, and Dyspepsia; Pimples, Boils, Blotches, Sties on the Eyelids, Sore Eyes, and other varieties of skin diseases. In all such cases, take **AYER'S** Sarsaparilla. It will healthfully stimulate all the great organs of the body to expel the poisons which clog your blood; it will quicken your appetite, and regulate your liver and bowels; it will overcome that tired feeling, free your skin from eruptive diseases, make your step lighter, your eyes brighter, your head clearer, and your arm and body stronger. It will prepare you for the warm summer weather better than any other remedy can. For Scrofula, Catarrh, Rheumatism, or for any other disease originating in impure blood, take **AYER'S** Sarsaparilla. **BE SURE** to get **AYER'S.**

THE AGRICULTURAL REVIEW.

Notable Articles of the Month.

(*Continued From Page* 334.)

the mouth open, and boiling it for ten minutes, then closing the mouth and steaming it ten minutes more. This will kill all the disease-germs and decrease the number, so that the milk will keep sweet for a long time. The boiled taste follows this process, but machines are made in Paris which kill most of the bacteria while preserving the natural taste of the milk. After being heated to a temperature of about 155° Fahrenheit for a few minutes, the milk is cooled rapidly to a low temperature, with the result just mentioned. This is called pasteurization.

Butter owes its flavor to bacteria, the ripening process of the cream in manufacture being nothing less than a breeding of bacteria on a large scale. Some specimens of ripened cream contain five million bacteria to a drop. They affect the cream in two ways, producing lactic acid, and causing decomposition processes which give ripened cream its odor and taste. They are harmless, and disappear from the butter in a few weeks. There are certain species which produce a bad flavor. Good bacteria make butter choicer and more salable. Bad spoil it, and oftentimes there is a battle between the good and bad species, during the ripening process, for the ascendancy. What is to prevent the bacteriologist finding the right bacteria to give a proper aroma to the butter, and furnishing them in quantity to the butter-maker to use in time of trouble? Promising experiments in this direction have been made in Germany, Denmark and this country.

Bacteria remain in cheese and multiply, giving it its flavor. Here, as in butter, there are agreeable bacteria and disagreeable. Poisonous bacteria have been khown to get into cheese, causing death.

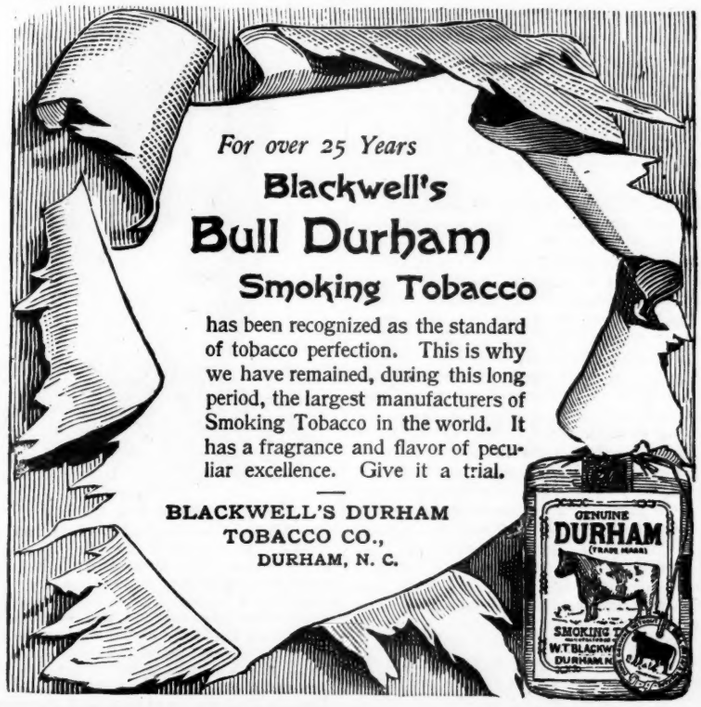
The Pure Food Bill, as passed by the Senate of the United States, is worthy of prompt enactment by the House and approval by the President. It is singularly concise, brief and clear in its provisions. They apply to the interstate or foreign trade in domestic food and drugs a system of government inspection that must in time have great influence in throttling the evil of food adulteration.

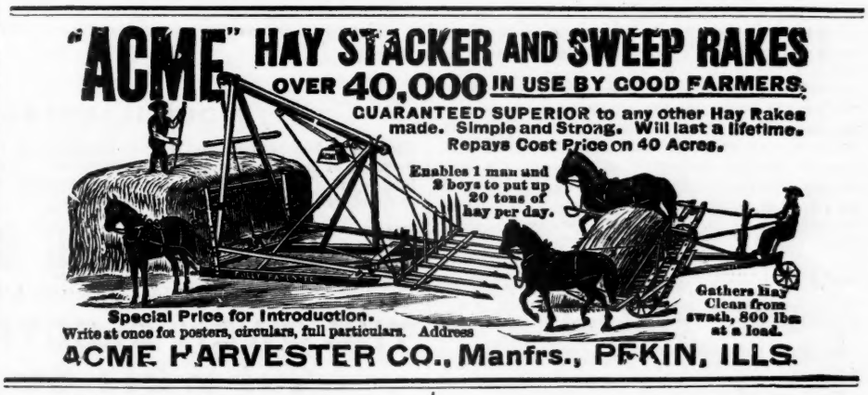
The Beet Sugar Question has been well stated in the AMERICAN AGRICULTURIST, and if the policy adopted by the present administration be continued for ten or fifteen years it will most surely result in the United States becoming independent of foreign sugar, and enriching her own people, to the extent of the sugar grown and made in her domain, not less than $100,000,000 annually. Our planters are feeling the loss of the United States bounty which they have received for 15 years past, but, with economy, our larger plantations will be able to make ten per cent. dividends. Eventually annexation may bring a change. Public sentiment appears to be drifting that way now.

H. M. WHITNEY, Honolulu, Hawaiian Islands.

It Pays to Spray Fruit Trees. — S. Trumbon, Northampton Co., Penn., writes us: "About five years ago, when my apple trees commenced to bear, the fruit was very wormy, and dropped off before it was ripe. The following year I sprayed the trees with Paris green, and had plenty of fine, healthy apples. Two years ago I neglected to spray, and the consequence was that the apples were wormy and dropped off. Last year I sprayed again, with three-fourths of a pound of London purple to 80 gallons of water, which quantity was sufficient for 50 trees. The result was wonderful. While I had the very best fruit, and plenty of it, my neighbors, who did not spray, had mostly wormy apples, which dropped off prematurely, and my apples sold for 50 per cent. more than theirs."

"Don't Tobacco Spit Your Life Away."—Is the name of a little book that tells all about *Notobac*, the *only guaranteed cure* for the *tobacco habit* in *every form*. This book is mailed free. Contains many testimonal letters, reporting *cures in ten days* and a gain of as many pounds. *Notobac* costs but a trifle, and the man who *wants to quit and can't* had better write for the book to-day. Address **Sterling Remedy Co.**, Box 508, Indiana Mineral Springs, Ind.


For over 25 Years
Blackwell's
Bull Durham
Smoking Tobacco
has been recognized as the standard of tobacco perfection. This is why we have remained, during this long period, the largest manufacturers of Smoking Tobacco in the world. It has a fragrance and flavor of peculiar excellence. Give it a trial.
BLACKWELL'S DURHAM TOBACCO CO.,
DURHAM, N. C.
GENUINE
DURHAM


"ACME" HAY STACKER AND SWEEP RAKES
OVER 40,000 IN USE BY GOOD FARMERS.
GUARANTEED SUPERIOR to any other Hay Rakes made. Simple and Strong. Will last a lifetime.
Repays Cost Price on 40 Acres.
Enables 1 man and 2 boys to put up 20 tons of hay per day.
Gathers Hay Clean from swath, 800 lbs at a load.
Special Price for Introduction.
Write at once for posters, circulars, full particulars. Address
ACME HARVESTER CO., Manfrs., PEKIN, ILLS.

ADJUSTABLE ROPE HALTER,
"COVERT'S."

This halter can be quickly and easily adjusted to fit the smallest colt or the largest horse, and when once adjusted remains firm and immovable until a change is required. It can never kink or get twisted, and no part can be broken or disarranged

It is the best and cheapest halter made.

By attaching a Bit to the Halter with our No. 510 Double Snaps, as appears in cut, makes it a safe, convenient and economical open bridle.

For sale by all Hardware and Harness Dealers. Ask your dealer to order them for you.

COVERT MFG. CO.,
West Troy, N. Y.

OUR LATEST
THE GEM
STEEL
WIND ENGINE
AND
GEM STEEL TOWER

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A GUIDE TO THE SCIENTIFIC EXAMINATION OF SOILS: Comprising Select Methods of Mechanical and Chemical Analysis and Physical Investigation. Translated from the German of Dr. Felix Wahnschaffe, with additions by William T. Brant, editor of "The Techno-Chemical Receipt Book." Illustrated by Twenty-five Engravings. Philadelphia: Henry Carey Baird & Co. Cloth, pp. 177.

This book is of special interest to agricultural scientists. Only methods yielding scientifically useful results are given. We are told that some of the methods of analysis described are in use in the Royal Prussian Geological Institute, while others have been adapted and modified by the author from approved text books. The work treats, first, of the Derivation and Formation of the Soil, the other divisions following this in logical sequence, as indicated by some of the subjects treated in the principal chapters. The Classification of Soils arranges the different varieties according to their constituents. The object of Soil Analysis is succinctly stated. Preparatory Labors for Soil Analysis, is a most important chapter, as upon the proper selection and care of the samples depends, in a great measure, the value of the analysis. Under Mechanical Soil Analysis is given the quantitative determination of the proportional quantities of coarser and finer constituents composing the soil. Two methods are described: Granulating with the sieve, and elutriating with water. Illustrations are given of Noebel's, Schoene's, Hilgard's, and other elutriating apparatus. The chapter on Determination of the Soil Constituents treats of the processes and apparatus for determining all the principal constituents, both organic and inorganic. Determination of the Plant-Nourishing Substances deals not only with those already available in the soil, but with those which gradually become available. This is one of the most practical chapters in the book. Another important chapter is the determination of the substances in the Soil Injurious to the Growth of Plants. The determination of various properties of the soil, General Rules for Soil Analysis, complete the list. A complete index, alphabetically arranged, aids greatly in using the book. Sold by the Orange Judd Co. Price, $1.50.

THE PERPLEXED FARMER, How is he to Meet Alien Competition? Three Lectures given at Brussels, before the Belgian Royal Central Society of Agriculture, by Georges Ville. Translated from the Fourth French Edition, with additional matter supplied by the Author, by William Crookes, F. R. S., V. P. C. S., etc. London and New York: Longmans, Green & Co. Cloth, pp. 208.

The lecturer combines science and practice. The results of growing plants in pure calcined sand, with the addition of different elements of plant growth and water only, are given. The element which determines the yield of a plant, he calls the dominant of that plant. Tables, showing the dominants of many different plants, are given. The causes and remedies of agricultural failures are discussed. The results secured by different kinds of rotations are compared. The whole is an argument for special chemical fertilizers as against indiscriminate manuring. The appendix sums up the arguments in tabular form. Sold by the Orange Judd Co. Price $1.75.

SOILS AND CROPS OF THE FARM. By George E. Morrow, M. A., and Thomas F. Hunt. Illustrated. 12mo. pp. 303. Cloth. Chicago: Howard & Wilson Publishing Co.

The Farmers' Progressive Reading Circles will study with pleasure this readable account of profitable plants and animals and their homes. The methods of making available the plant-food in the soil are described in popular language. A short history of each of the farm crops is accompanied by a discussion of its culture. The useful discoveries of science are explained as applied in the most approved methods of culture. Every farmer will be benefited by the perusal of this handbook. Sold by the Orange Judd Co. Price $1.

HOW TO STRENGTHEN THE MEMORY; or, Natural and Scientific Methods of Never Forgetting. By M. L. Holbrook, M. D. 12mo. pp. 152. IX. Cloth. New York: M.L.Holbrook & Co., 23 Clinton Place.

A stronger memory is the wish of every worker. Only the idle and the criminal seek oblivion. Dr. Holbrook does not advise a system of catch-words, but clearly explains what is known about vivid

(*Continued on Page* 345.)

MRS. D. E. BRIDGES.

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CURED OF

NERVOUS PROSTRATION

—AND—

GENERAL DEBILITY.

GRANT, NEB., JAN. 11, '92

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They can be had Japanned or Galvanized at slight additional cost, thus preventing **rust.** If no hardware dealer in your vicinity keeps them, write us.

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OUR LIBRARY CORNER.

(*Continued from Page* 344.)

first impressions, and their reproduction when needed. Scientific reasons are given for the many practical suggestions for making the brain strong from good health, and vigorous from continuous well-planned exercise. This is not a memory made easy, but a memory made possible to everyone who has common sense and perseverance. Sold by the Orange Judd Co. Price $1.00.

FARMING CORPORATIONS. By Wilbur Aldrich. 12 mo. pp. 255. Cloth. New York: W. Aldrich & Co., 120 Broadway.

Mr. Aldrich enthusiastically pictures an imaginary farmers' association. Many of the suggestions will be helpful to those practical farmers whose executive ability is now making a success of coöperation in certain lines of farm industry. Sold by the Orange Judd Co. Price $1.

MODERN AMERICAN RIFLES. By A. C. Gould ("Ralph Greenwood"). Illustrated. 8vo. pp. 338. Cloth. Boston: Bradlee Whidden.

The rifle which adds so much to the enjoyment of rural life is described in all its stages of manufacture. A large portion of the book is devoted to the various kinds of rifle sights and the methods of using them. As factory-made cartridges are not reliable for accurate shots, directions are given for bullet-making and loading cartridges. The figures of the positions adopted in the various styles of shooting are clear and instructive. The book is a very full record of inventions, improvements and work accomplished with American rifles. Sold by the Orange Judd Co. Price $2.00.

ORANGE CULTURE IN FLORIDA, LOUISIANA AND CALIFORNIA. By J. W. Moore. 12mo. pp. 189. Cloth. New York: E. R. Pelton & Co.

The rapidly increasing production of oranges in California, Arizona and Florida makes this work of great value. Full directions are given for locating the grove, selecting varieties, planting, pruning and cultivation. The insects damaging the tree and fruit are described, with methods of applying efficient remedies. The chapter on the diseases of the orange gives the latest knowledge regarding blight, die-back, foot-rot, scab, leaf-spot and sooty mold. Careful instructions are given for harvesting and shipping. Cheapened transportation now allows the orange to compete with the apple in all our markets. Sold by the Orange Judd Co. Price, postpaid, $1.

ROAD CONSTRUCTION AND MAINTENANCE. Prize Essays. 12mo. pp. 109. Paper and Cloth. New York: The Engineering Record.

The widespread movement for the improvement of our highways has led to the timely publication of these studies on making and preserving our country roads. The treatment of grades and drainage is very practical. Without exception, these eminent engineers favor a broken stone surface for both light and heavy traffic. No one doubts that this would pay near villages and towns, but it is even claimed that a crushed stone surface for the long stretches of country roads in the Mississippi valley would be as good an investment as the railways have been. Many farmers, however, look at this matter in a different light from that of the bicycler and pleasure driver, and favor well graded and drained earth roads. Sold by the Orange Judd Co. Price in paper 50 cents, in cloth, $1.00.

CATALOGUES ACKNOWLEDGED.

JOHN GARDINER & CO., Philadelphia, Pa.: Illustrated and descriptive catalogue of flower, vegetable and field seeds, ornamental plants; also poultry and poultry supplies. Several special collections of flowering plants.

V. H. HALLOCK & SON, Queens, N. Y.: Price-list of gladiolus, lily, and other bulbs.

JACOB W. MANNING, Reading, Mass.: Illustrated and descriptive catalogue of ornamental trees, shrubs, and climbing vines; also catalogue of choice hardy perennials; also descriptive catalogue of large and small fruits.

ALTON M. SHEPHERD, Minneapolis, Minn.: Catalogue of small fruit plants, seeds, and berry crates.

MRS. THEO. B. SHEPHERD, Ventura, Cal.: Descriptive catalogue of California flowers, ornamental trees, shrubs, roses, plants, and seeds.

A. W. STEVENS & SON, Auburn, N. Y.: Illustrated and descriptive catalogue of grain threshers, separators, engines, mills, powers, corn shellers, harrows, rakes, cultivators, etc. This is a highly

(*Continued to Page* 346.)

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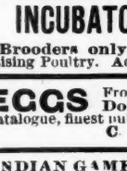

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Our Library Corner.

(*Continued from Page 345.*)

interesting and handsome catalogue. The covers are made a real work of art.

SYKES IRON & STEEL ROOFING CO., Chicago, Ill., and Niles, Ohio: Souvenir catalogue of the Sykes' patent improved standing seam roofing, corrugated roofing and siding, clapboarding, ceiling, steel lath, brick, etc. This catalogue is embellished with a large number of very handsome half-tone photo-engravings, clearly illustrating the various uses to which these are applied.

VILMORIN-ANDRIEUX & CO., Paris, France: Catalogue of trees, shrubs, seeds, and plants for greenhouse and garden.

C. E. ALLEN, Brattleboro, Vt.: Illustrated and descriptive catalogue of vegetable and flower seeds; also greenhouse and bedding plants, small fruits, etc.

ALLIANCE CARRIAGE CO., Cincinnati, O.: Illustrated catalogue and price-list of carriages, carts, and harness of every description. All the work of this company is strictly hand-made and warranted.

D. BRANDT, Bremen, Ohio: Descriptive and illustrated catalogue of strawberries, raspberries, blackberries, grapes, etc. This is a large, carefully selected list, and the descriptions given are remarkably clear and accurate.

C. S. BURCH & CO., Chicago, Ill.: Illustrated and descriptive catalogue of wool-growers' supplies, comprising everything required for successful sheep raising.

CANTON STEEL ROOFING CO., Canton, Ohio: Catalogue and reference book of all styles of sheet metal, roofing, ceiling, siding, roof paints, etc. Rock patent slip joint eave-trough a specialty. This is a very handsome pamphlet, elegantly printed, and richly illustrated with first-class engravings.

ELLWANGER & BARRY, Mount Hope Nurseries, Rochester, N. Y.: General catalogue of fruit and ornamental trees, shrubs, roses, peonies, hardy border plants, etc. The first part is devoted to tree fruits and small fruits; the second to ornamental trees, flowers, shrubs, flowering plants; and the third to roses. This handsome pamphlet of 160 pages is far above the ordinary style of catalogue, and deserves a place in every horticultural library.

FIELD FORCE PUMP CO.: Illustrated catalogue of the latest improved outfit for spraying fruit trees by hand and horse power. It also contains hints and suggestions for the protection of fruits from the ravages of insect pests.

R. DOUGLAS & SONS, Waukegan, Ill.: Wholesale catalogue and price list of evergreen trees, and forest and ornamental tree seedlings; also new and rare evergreens. Forest trees by mail a specialty.

Headers and Headed Wheat. — J. Fleming, Manitoba, B. C., writes us: "In an article on 'Wheat growing in the Northwest,' in a recent number of the AMERICAN AGRICULTURIST mention is made of the header, stating that one team will cut, and three teams stack 30 to 35 acres a day. I have always understood that millers prefer wheat cut in the 'dough' stage, as then the bran is much thinner and more flour is made to the bushel. If headers are such labor-saving implements, as Mr. Wade says, why does the use of them not become more general where the straw cannot be all used. They would also be a most effective means of fighting the twine trust. Would like to hear more about them by those who have used them."

I. C. Wade, to whom the above has been referred, answers as follows: "The team that runs the header, a 14-foot Randolph, consists of four mules of about 1,100 pounds weight each. They do the work easily, but, as they have to keep moving right along, in very hot weather it might be desirable to have a change team. It is a mistake about the wheat not being all right. The 'report' concerning the milling qualities is true. The millers, of course, object to anything they can to cut down the price of No. 1 Hard, but with the exception of 1888, when we had some frost, I, for 10 years, have sold my wheat for No. 1 Hard. I do not know of another farmer in Dakota who can say any better. In 1884 I was told by our millers that they would not have headed wheat. I asked them if they could tell it on sight. They said, 'Certainly.' So when I threshed I sent one of my men to the mill with a load, instructing him not to mention a word about the wheat, but to get as good a price as possible. He came back with not only the highest price, but a promise of a two-cent raise if he would bring in the whole crop, and I have had no trouble since then. With 10 years experience, I see no reason why every one should not use headers, except, possibly, where wheat is very weedy, as weeds might color it. Certainly, heading saves the entire twine bill. I can cut and stack for about the same price as one's expense to stack from the shock. The cause of headers not being universally used is largely prejudice. Also it must be remembered the binder men are much more aggressive than the header men. Hundreds of farmers who were formerly opposed to headers are using them now exclusively."

Liming Low Lands. — Clarence Walker, Butler Co., Pa.: It is not customary among farmers to use fresh stone lime on their land, but that which has been air slaked, or that from the gas works called gas lime. But there is no objection to using the caustic lime fresh from the kiln, but a less quantity of the latter will be required to produce the desired results. To apply the lime in lumps as it comes from the kiln, would prevent an even distribution over the surface, and for this reason it is better to slake it, and apply it afterward. Throw the fresh lime into a broad, flat pile, and where an abundance of water is near at hand. When ready, sprinkle the surface or throw water over the lime by the pailfuls, and, as it heats, throw on more, and continue until the entire heap has slaked, but withhold the water in time, leaving the lime in a fine powder, and not in a lumpy condition. As soon as it is cool, haul out and spread over the surface of the ground where it will soon sink down, producing the chemical effects desired in its passage through the soil. Six to ten bushels per acre of the freshly-slaked lime will be sufficient for one application, and we would not apply it until the land had been plowed, harrowed and ready for planting the corn, or whatever you propose to put in this spring.

SPRAYING FRUIT TREES.

We illustrate above the Lewis Combination Spraying Outfit, made by the C. P. Lewis Mfg. Co., of Catskill, N. Y. This outfit is made of brass and makes three complete machines, *i. e.*, a spray pump, an agricultural syringe or potato-bug exterminator and a veterinary syringe combined. This pump is fitted with two of Lewis' Patent Graduating Spray Nozzles. One, the ordinary nozzle for spraying fruit trees, washing wagons, windows, etc., the other being a very fine nozzle for spraying grape vines. With these nozzles you can change from solid stream to fine or coarse spray instantly, while pumping, as shown in above cut. The above outfit is well named "The Wonder." It is indorsed by 14 of our State Entomologists. The manufacturers *guarantee satisfaction or money refunded, and prepay express.* As they claim this outfit will do as much and as good work as other outfits costing $10 and $15 each, we think it would be well for our subscribers to write them before purchasing spraying outfits. They issue a 130 page Illustrated Catalogue and Farm Book, which will be sent upon receipt of a two-cent postage stamp. This book treats on all kinds of farm crops, tells when and how to plant, the kind of fertilizer best adapted to each crop, quantity of seed per acre, etc., and full instructions on the management of all kinds of farm crops, also a valuable treatise on insects of all kinds and the best means of destroying them. We would advise our subscribers to send for a copy of this valuable book at once. Address P. C. LEWIS MFG. CO., Catskill, N. Y.

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The tooth is held in position by a Ratchet with which it can be adjusted so as to wear from 15 to 18 inches off the point of the tooth, which is four or five times as much wear or service as can be obtained from any other Spring-tooth Harrow in existence. Catalogues free. *Agents Wanted.*
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Shipman Engine Co.,
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WE GIVE A SET OF HARNESS (as shown in Illustration) FREE

to any one who will sell Six Sets for us. Regular price for this Harness is $12.00. We sell it for spot cash with order for $5.25 in order to introduce our goods and show Buyers of Harness how to save money. We are the largest manufacturers of harness in America, and use only the best Oak Tanned Leather in our work. We sell Harness for $5.25 per set and upward. If you want a SET OF HARNESS FOR NOTHING order a sample set and sell Six for us. The money paid for sample will be refunded when you order the Six Sets (same as sample). Address all orders to

WRITE for our FREE Illustrated CATALOGUE.

FOSTER BUGGY AND CART CO.,
No. 16 Pike Bld'g, CINCINNATI, O.

We will furnish the most economical roofing and siding, all styles. Also Metallic Shingles from Iron or Steel with full directions and low prices.

GARRY IRON ROOFING CO., Cleveland, O.
Mention Agriculturist.

DONT BUY ROOFING or SIDING TILL YOU HAVE SEEN OURS THE BERGER MFG. Co. CANTON, O.

IDEAL In Name and In Fact.

WIND MILL

and Three Post
STEEL TOWER.
The LATEST and BEST.
Sizes 8-9-12 ft. Geared. 10 and 12 ft. Ungeared.
TOWERS, 30, 40, 50 & 60-ft.
Mills with or without graphite bearings.

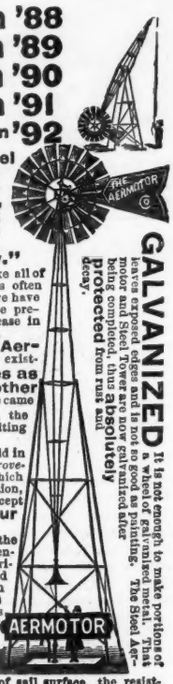
We also Manufacture the IDEAL Solid and Sectional Wheels for Pumping and Power Purposes.

STOVER MFG. CO.,
510 River St., FREEPORT, ILL.

45 sold in '88
2,288 sold in '89
6,268 sold in '90
20,049 sold in '91
60,000 will be sold in '92

A Steel Windmill and Steel Tower every 3 minutes.

☞ These figures tell the story of the ever-growing, ever-going, everlasting Steel Aermotor. Where one goes others follow, and we "take the country."



Though sold, we were unable to make all of the 20,049 Aermotors in '91. Orders often waited 8 weeks to be filled, but now we have vastly increased our plant and are prepared promptly to plant our increase in every habitable portion of the globe.

Are you curious to know how the Aermotor Co. in the 4th year of its existence, came to make many times as many windmills as all other makers combined? How we came to originate the Steel Wheel, the Steel Fixed Tower, the Steel Tilting Tower?

1st. We commenced in a field in which there had been no *improvement for 25 years*, and in which there seemed no talent or ambition, and none has yet been shown except in *feeble* imitation of our inventions.

2d. Before commencing the manufacture, exhaustive scientific investigation and experiments were made by a skilled mechanical engineer, in which over 5,000 dynamometric tests were made on 61 different forms of wheels, propelled by artificial and therefore uniform wind, which settled definitely many questions relating to the proper speed of wheel, the best form, angle, curvature and amount of sail surface, the resistance of air to rotation, obstructions in the wheel, such as heavy wooden arms, obstructions before the wheel, as in the vaneless mill, and many other more abstruse, though not less important questions. These investigations proved that the power of the best wind wheels could be doubled, and the AERMOTOR daily demonstrates it has been done.

3d. To the liberal policy of the Aermotor Co., that guarantees its goods satisfactory or pays freight both ways, and to the enormous output of its factory which enables it to furnish the best article at less than the poorest is sold for. For '92 we furnish the most perfect bearings ever put in a windmill, and have made an exhaustive revision of the Aermotor and Towers.

If you want a strong, stiff, Steel Fixed Tower—or if you want the tower you don't have to climb (the Steel Tilting Tower) and the Wheel that runs when all others stand still that costs you less than wood and lasts ten times as long (The Steel Aermotor) or if you want a Geared Aermotor to churn, grind, cut feed, pump water, turn grindstone and saw wood, that does the work of 4 horses at the cost of one ($100), write for copiously illustrated printed matter, showing every conceivable phase of windmill construction and work, to the AERMOTOR CO., 12th and Rockwell Sts., Chicago, or 12 Main St., San Francisco.

GALVANIZED It is not enough to make portions of a wheel of galvanized metal. That which is exposed edges and is not so good as painting. The Steel Aermotor is painted after being completed, thus absolutely protected from rust and decay.

The Aermotor Pneumatic Water Supply System enables you to supply every part of your house with water without an Elevated Tank.

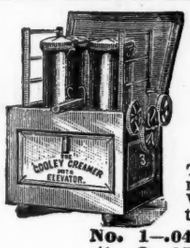
SUPERIOR STEEL ROOFING

MADE OF

Write for Catalogue, samples and price list. Strictly Genuine Steel. Also SIDING, CEILINGS, etc.
KANNEBERG ROOFING CO., Canton, Ohio.

FOR BEST HAY PRESSES STEEL PRESSES.

SELF FEEDER
ADDRESS P. K. DEDERICK & CO.
DEDERICK'S WORKS, ALBANY, N.Y.



No System or Method

CAN COMPARE FAVORABLY WITH THE

COOLEY CREAMERS,

In the exhaustive separation of the cream from the milk.

The only submerged or water sealed method of raising cream. Skimmed milk analyzed by the Vt. Experiment Station showed less than one-twentieth of one per cent. of fat, viz:

No. 1—.04 of 1 per cent. of fat.
" 2—.05 of 1 per cent. of fat.
" 3—.00 of 1 per cent. of fat.
" 4—.05 of 1 per cent. of fat.
" 5—.06 of 1 per cent. of fat.

It gets all the butter fat from the milk, and makes Butter that has taken

23 GOLD MEDALS.

VERMONT FARM MACHINE CO., Bellows Falls, Vt.
Manufacturers of everything used in Dairies or Creameries.

Send for Circulars.

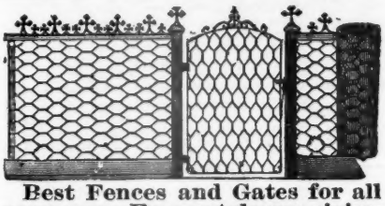
Yankee Swivel Plow.

The Leading Wood Beam Reversible Plow of America.

Sizes for One, Two or Three Horses.

Patent Spring Foot Latch, Automatic Jointer Straight Steel Coulter, or Rolling Caster Coulters, and all late improvements.

Belcher & Taylor Agricultural Tool Co.,
Box 120. CHICOPEE FALLS, MASS.



Best Fences and Gates for all purposes. Free catalogue giving particulars and prices. Write THE SEDGWICK BROS. CO., RICHMOND, IND.

Eastern Agent, EDWARD SUTTON, 16 South 3rd Street, Philadelphia, Pa.
Mention AMERICAN AGRICULTURIST when writing.

UNCLE TOM'S CABIN

For 25 Cents!

THE printing of "Uncle Tom's Cabin" in the *Universal Edition* shows the great achievements of the press at the present day. To print 160,000 copies of a volume of this sort clearly, on good paper, bind it strongly in artistic covers, and place it before the public for the sum of 25 cents, is an effort which might task a philanthropic society, not to mention a firm whose business is the making and selling of books. This, however, is precisely what has been done in the *Universal Edition* of "Uncle Tom's Cabin;" and the extraordinary sale of the book, which, in spite of the many years that it has been before the public, shows no sign of diminution, will be, it is believed, doubled and quadrupled by its appearance in this form.

Looking back at the system of which "Uncle Tom's Cabin" was at once a picture and a chief means of overthrowing, Northern and Southern writers recognize the truthfulness of the book, and vie with each other in praising it, while its fame abroad is scarcely less than that which it possesses in the United States. There have been thirty-five English editions of the original work, eight abridgments and adaptations.

The publishers have called this Edition the "*Universal*" in the belief that as the book is universal in its fame, this Edition may become universal in its circulation. It is sold in a striking paper cover for 25 cents; in a strong and attractive cloth cover for 50 cents, postpaid.

A Book For Twenty-Five Cents so famous that it has been translated into 20 Languages.

The paper edition is given for 1 new subscription; the cloth edition for 2 new subscriptions, at the club rate of $1 00 per year. Or we will furnish the CLOTH EDITION and extend a present subscriber's subscription one year from expiration for $1.60, postpaid. Address.

AMERICAN AGRICULTURIST,
52 and 54 Lafayette Place, New York.

WHOSE ANSWERING AN ADVERTISEMENT WILL CONFER A FAVOR UPON THE ADVERTISER AND THE PUBLISHERS BY STATING THAT THEY SAW THE ADVERTISEMENT IN THE AMERICAN AGRICULTURIST

What is Necessary in Beet-Sugar Culture.

I have received the April number of the AMERICAN AGRICULTURIST containing the very excellent article on beet sugar as an investment. I appreciate the action taken by the AMERICAN AGRICULTURIST regarding this new industry, which, in my opinion, will finally become well established in the United States, in face of many difficulties which lie principally with the farmers who hesitate to engage in the culture of the beets. Until this part of the work be perfected, which is necessary to make beet sugar manufacturing both possible and profitable, capital will hesitate to build the necessary factories. But if farmers will thoroughly, or even partially, master their share of the business to such an extent that there can be little doubt that a full supply of beets will be furnished in case a factory should be built, then, other things being favorable, capital will be easily secured. The two years I lived at Grand Island for the purpose of closely observing the agricultural methods taught, and the experiments made by some who did not, and do not yet approve of the methods adopted, besides information gained from all other sources, have thoroughly convinced me that our greatest efforts should be directed toward inducing the farmers to give this industry the most thorough experiment, selecting the most suitable land at their command, and in all respects prosecuting the work in the best manner possible. It was for this reason that I worked up our State association, and, when in Denver in January, recommended the same line of action. This line of action has been followed at a recent meeting there which was well attended, and which called forth the greatest interest. I have received many letters from different parts of Colorado declaring that every effort would be put forth to induce experimental planting by farmers in that State. I took particular pains to explain that no difficulty would be experienced in securing men with the necessary capital, or those who would furnish it, whenever a locality possessed all the necessary facilities for the successful operation of a factory. We must first be able to say that we have experimented in the cultivation of the sugar beet to such an extent, and with such results, that we are able to present the names of farmers who, from their experience and the results which they obtained, will guarantee to grow the required acreage at the prices which are now paid for the beets. I am very glad to see the AMERICAN AGRICULTURIST take hold of this subject of the manufacture of beet sugar from the sugar beet as ably as it has done.

M. A. LUNN, Lincoln, Nebraska.

Another Way to Free a Hennery From Vermin.—J. S. Woodward, Ontario Co., N. Y., writes us: "To free a hennery from vermin, spray thoroughly with kerosene emulsion, so as to fill every crack and crevice with the liquid. The trouble with either whitewash or fumigation is that they fail to go to the bottom of the hiding-places of the vermin The emulsion gets there. To make the emulsion for this purpose, take of hard soap one-half pound, or of soft soap two quarts, and one gallon of boiling water; stir until the soap is all dissolved, then add one quart of kerosene, stirring until well mixed. An egg-beater is a good thing to mix with, or a small force pump is better to pump it back into itself. When thoroughly united, add 10 gallons of water, and again stir well. With a force pump spray the inside of house and roosts or, in the absence of a pump, apply with a brush, sponge, or large cloth. No matter what, if it be bountifully used. It is a capital plan to spray the fowls at night, when on the roosts, only when this is done there should be added one-half more water. If the house is sprayed about twice, and the fowls sprayed three times, each summer, 'nary a louse' will remain. Extreme care must be used in spraying the fowls, and if the house itself be thoroughly cleaned this will be found unnecessary."

About Harrows.—Duane H. Nash, Millington, N. J., issues a neat pamphlet about harrows—what they were, what they are, and what they should be. In a pleasing way are described the principal forms of harrows used from the time when harrowing was done with a big branch of a tree tied to the horse's tail, through all the various changes up to the invention and perfection of the Acme harrow, that peerless pulverizer, clay crusher and leveler.

Short time only I will send my Electric Belts and Trusses

DR. JUDD'S On 6 Months' Trial

If You Wish Health, Address DR. C. B. JUDD, Detroit, Mich.

WILL CURE RHEUMATISM INDIGESTION TOBACCO HABIT LAME BACK HEADACHE LIVER COMPLAINT KIDNEY COMPLAINT NERVOUSNESS DYSPEPSIA PARALYSIS

ELECTRIC BELT

ON 6 MONTHS' TRIAL.

Free Medical Advice and Treatment during the six months' trial. My new improved Electric Belts are Batteries and Belts combined; generates sufficient Electricity to produce a shock. In ordering, give price of Belts ($3, $6, $10, $15), waist measure, and full particulars. Agents wanted.

BUTTE CITY, MONT., Jan. 16, 1892.—Within the last eighteen months we have taken in over $1,000 for Judd's Electric Belts and Trusses and have never had a single complaint, but have had many compliments passed upon them.

DR. C. B. JUDD, Detroit, Mich. P. M. NEWBRO DRUG CO.

There is NO "SURE CURE FOR EVERY CASE OF ASTHMA" or "EVERY CASE OF HAY FEVER," but the worst cases, if uncomplicated by organic disease, can be CURED TO STAY CURED by constitutional treatment, and this at the patient's home.

ASTHMA AND HAY-FEVER

We treat no one without a thorough knowledge of the case.

Incurable Cases Declined.

Examination free by mail.

We want name and address of every sufferer from Asthma or Hay Fever.

P. HAROLD HAYES, M. D., BUFFALO, N. Y.

Kennedy's Medical Discovery

Takes hold in this order:

Bowels,
Liver,
Kidneys,
Inside Skin,
Outside Skin,

Driving everything before it that ought to be out.

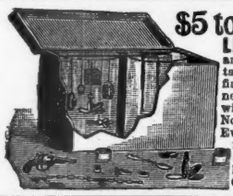
You know whether you need it or not.

Sold by every druggist, and manufactured by

DONALD KENNEDY,
ROXBURY, MASS.

ANCHOR FENCE POST.

Is the easiest set, most indestructible and only practical iron post made for all kinds of wire and metal fencing for farm and ornamental purposes. Circulars and prices sent on application to ANCHOR POST CO., 49 West 42d St., New York.



$5 to $15 per day, at home, selling LIGHTNING PLATER and plating jewelry, watches tableware, &c. Plates the finest of jewelry good as new, on all kinds of metal with gold, silver or nickel. No experience. No capital. Every house has goods needing plating. Wholesale to agents $5. Write for circulars. H. E. DELNO & Co., Columbus, O.

(PATENT ALLOWED.)

Pat. July 28, 1891.

'RUPTURE CURED.

Worn Night and Day. Perfect Comfort. Holds the worst rupture with ease. Has a new Pad which can be made larger or smaller by the patient. Sent by mail everywhere. Illustrated catalogue and rules for self-measurement sent securely sealed. G. V. House Mfg. Co., 744 Broadway, N. Y. City.

A BIT HAVING NO OBJECTIONABLE FEATURE.

The most vicious horse can be DRIVEN and CONTROLLED WITH EASE. Works the same as the J. I. C., but don't pull up so easy.

LEADS THEM ALL

Sample mailed X C for Nickel $1.50. $1.00
Stallion Bits 50 cents *extra.*

RACINE MALLEABLE IRON CO. RACINE, WIS. J. P. Davies, Mgr.

PILES CURED FREE, New, Painless, Certain. Gives instant relief and lasting cure—never returns. To prove it we will send a trial package FREE, to any address. PYRAMID DRUG COMPANY, Box 35, ALBION, MICHIGAN.

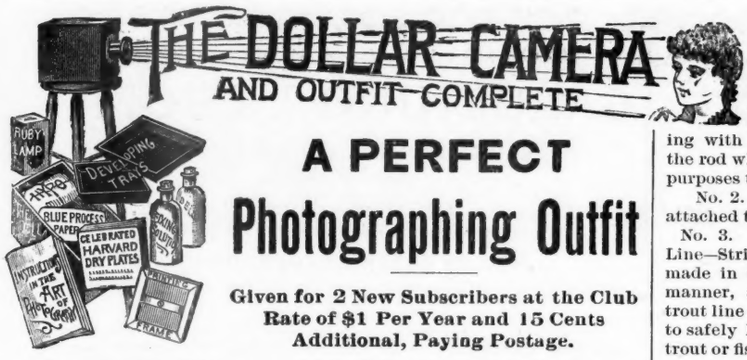
I START YOU in Practical Photography to *earn money* at home. Only a small investment and *no experience* required. Genteel business for MEN and WOMEN. It will PAY YOU. Sample Photo and 48-page book of particulars fo. 20 cents. Z. SCHULTZE, 5 Chatham Sq., New York.

$3 Voltaic Electric Belt cures the *weak, nervous, pains, kidney* diseases. Dr. G. W. Dively, Cincinnati, O.

New Cards Largest Sample Book of genuine hidden name, silk fringe, envelope, acquaintance & calling cards ever offered for a 2c. stamp. Buckeye Card Co., Laceyville, Ohio. **1892**

MEN, WOMEN, BOYS and GIRLS Wanted. New beginners make from 50c to $1 an hour at home. Send your address for samples and full particulars to Grand Central Novelty Co., Buffalo, N. Y.

FREE For 30 Days. Wishing to introduce our CRAYON PORTRAITS and at the same time extend our business and make new customers, we have decided to make this Special Offer: Send us a Cabinet Picture, Photograph, Tintype, Ambrotype or Daguerotype of yourself or any member of your family, living or dead and we will make you a CRAYON PORTRAIT FREE OF CHARGE, provided you exhibit it to your friends as a sample of our work, and use your influence in securing us future orders. Place name and address on back of picture and it will be returned in perfect order. We make any change in picture you wish, not interfering with the likeness. Refer to any bank in Chicago. Address all mail to THE CRESCENT CRAYON CO. Opposite New German Theatre, CHICAGO, ILL. P. S.—We will forfeit $100 to anyone sending us photo and not receiving crayon picture FREE as per this offer. This offer is bonafide.



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NOT ONLY A CAMERA BUT A WHOLE OUTFIT WITH WHICH YOU CAN DO ALL CLASSES OF PHOTOGRAPHING.

Now please remember that you are not buying a Camera **ONLY**, but a complete and **PERFECT OUTFIT**, all ready for use without further expense to you. **NO SUCH OUTFIT HAS SOLD HERETOFORE FOR LESS THAN $5.** Everything is carefully made and prepared, and bound to work perfectly. A wonder to all who see it and its work. You are not restricted to any class of pictures. You can take Landscapes, Portraits, Buildings—in fact **ANYTHING.**

BE YOUR OWN PHOTOGRAPHER! WHY NOT LEARN THIS BEAUTIFUL AND USEFUL ART AND BE INDEPENDENT?

How many places of interest, scenes, and friends that are dear, do you encounter every day whose image you would like to preserve? With this outfit you can do it and almost without expense. It contains all the necessary materials—the instructions "do the rest." After you get this outfit all you have to do is to follow the instructions carefully and you will be able to take the same quality of pictures as the most **EXPERT PROFESSIONAL PHOTOGRAPHER.**

We have studied carefully all the details of our Camera and made the outfit complete in every respect, and our instructions so clear and exact that **NO ONE CAN FAIL** to operate it successfully.

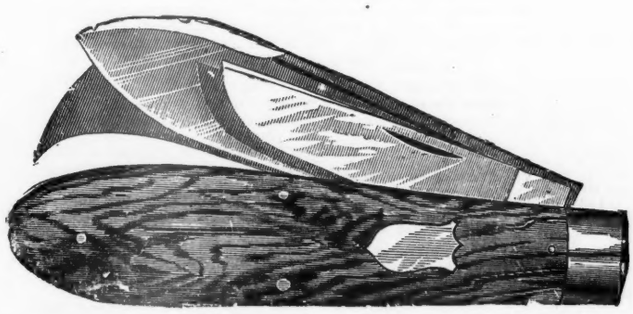
HOW SECURED.

FOR ONLY $1.25 We will send the Outfit by mail postpaid to any postoffice in the United States.

FOR ONLY ONE YEARLY SUBSCRIPTION to the AMERICAN AGRICULTURIST with $1.50, or for two yearly subscriptions with $2 we will forward the outfit free to the sender: 15 cents must be added for postage under this offer.

No. 177. "Common Sense" Pruning Knife.

Given to any Present Subscriber Sending Us 2 New Subscribers at the Club Rate of $1 Per Year.



This common sense knife contains a pruning blade, a jackknife blade, a budding and spaying blade. The cut gives the exact size. Every farmer, gardener and stockman in the country should have one of these knives. The blades are carefully forged from razor-steel, file-tested, and will be replaced without extra charge if soft or flawy.

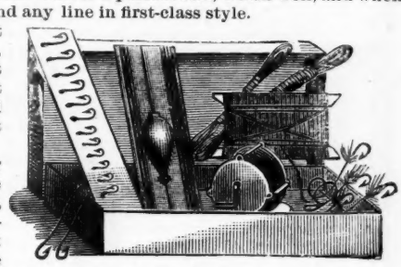
Price $1, postpaid, or with the AMERICAN AGRICULTURIST one year $1.75.

No. 456. Four-joint Fishing Rod and Outfit.

Given for 2 New Subscribers and 15 Cents Additional.

This complete fisherman's outfit consists of: No. 1. Four-joint Rod, light, strong and reliable, with reel-bands and butt-cap, suitable for trout, bass or pickerel fishing; either trolling or sinking with live bait. The length of rod joints is 25 inches each, making the rod when jointed 8 feet 4 inches long; weight, 11 ounces. For all practical purposes this is equal to the costly fancy rods.

No. 2. One Fine Brass Reel—This is a perfect reel, works well, and when attached to the pole will wind any line in first-class style.



No. 3. One Linen Trout Line—Strictly first-class, made in the most perfect manner, and the strongest trout line made; guaranteed to safely land the heaviest trout or fish of equal size.

No. 4. One Linen Bass or Salmon Line—Of the same high standard, but larger, adapted for big fish like salmon, or gamy fish like black bass. This line will land the biggest fish caught with bait and sinker, or trolling from boat.

No. 5. One Long Cotton Line—Dark colored, nicely cross-wound on a block, and good for everyday fishing after perch, catfish, sunfish, rock bass, etc.

No. 6. One Line Furnished Complete with Hook, Bob and Sinker—This is a whole outfit in itself, comprising a long and strong line with medium size hook attached and neat movable bob and sinker. With bait at hand and this line in his pocket, the fisherman can start right in and try his luck.

No. 7. One Dozen Best Steel-Ringed Fish Hooks (assorted sizes)—These are the best grade of hooks, warranted strong, sharp in points and barbs, and handy to use, anybody being able to tie their line into the ring of the hook. With this set of hooks the fisherman can try his luck for any size, from minnows to weakfish.

No. 8. Two Imported Trout Flies—These are the new improved style of fly. They will draw trout from deep pools when the other flies fail. They are natural, brilliant in colors, strongly fastened around the hooks, and will give excellent satisfaction.

No. 9. One Improved Bass Fly—This is the best improved fly for black bass fishing, and is the equal of the trout flies in excellence of material and artistic position.

No. 10. One Improved Salmon Fly—Also accompanies the outfit, and is of the best pattern and perfect in shape and color; sure to raise and catch the fish.

No. 11. Two Snell Hooks and Gut—These hooks are set on long guts, and where fish cut the lines, one of these snell hooks can be safely used; the gut cannot be severed and lands the fish every time.

Here, then, is a complete fisherman's outfit at the nominal price of $1.25. No excuse now; the poorest boy or man can afford this complete assortment, and ought to keep his family in fish the year round, or catch enough to sell. As much sport can be had with this outfit as with a ten-dollar one, and the quality of everything is as represented.

Price of the complete outfit, $1.25. Sent by mail postpaid.

For $2 we will send this outfit, postpaid, together with a year's subscription to the AMERICAN AGRICULTURIST.

The outfit and subscription sent to separate addresses if desired.

We will send the outfit without rod for 50 cents, or for one new subscriber.

No. 91. Self-Lighting Pocket-Lamp.

Given to any present subscriber sending us 1 new subscriber at the club rate of $1 per year.

Our cut shows a perfect instantaneous Self-Lighting Lamp of convenient size for the vest pocket and for home uses. It is a perfect light for carrying about the house, and entirely removes the dangerous use of matches. The Self-Lighting Lamp is indispensable to smokers and others, as the dangers attending the careless carrying of matches in the pocket have been too frequently illustrated to the reader to require any words on the subject. The fact that the use of half a dozen matches is often necessary in lighting a cigar (and for many other purposes) speaks volumes for this lamp, which by the turning of a screw, gives a light as long as needed. It is made of brass, highly finished, nickel plated, and warranted to work; 200 extra lights are included—put up in a finely finished brass case.

Price 50 cents postpaid.

One thousand additional Lighting Strips sent postpaid for 10 cents. With the AMERICAN AGRICULTURIST one year, $1.60.

TALKS ✣ ON ✣ MANURES.

FIFTH EDITION.

Feed the Soil and It Will Feed You.

How to do it Profitably Fully Explained in a Series of Practical and Familiar Talks Between the Author and the Deacon, the Doctor, and other Neighbors, on the whole subject of

MANURES AND FERTILIZERS.

By JOSEPH HARRIS, M. S.

Author of "Walks and Talks on the Farm," "Harris on the Pig," etc.

Including a chapter specially written for it by Sir John Bennet Lawes of Rothamsted, England.

There is scarcely any point relating to fertilizing the soil, including the suitable manures for special crops, that is not treated, and while the teachings are founded upon the most elaborate scientific researches, they are so far divested of the technical language of science as to commend themselves to farmers as eminently "practical." It is not often that the results of scientific investigations are presented in a manner so thoroughly popular.

This work, containing 40 chapters and 366 pages with an appendix, treats on the following subjects:

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Cloth, 12mo. Price, postpaid, $1.75.

IRRIGATION

—FOR THE—

Farm, Garden and Orchard

By HENRY STEWART.

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